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United States National Museum
Bulletin 216

Ichneumon-Flies of America North of Mexico:

1. Subfamily Metopiinae

By HENRY and MARJORIE TOWNES

SMITHSONIAN INSTITUTION • WASHINGTON, D. C. • 1959

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1959

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price $1.25 (paper)

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Ichneumon-Flies of America North of Mexico

Henry and Marjorie Townes

Introduction

THIS SERIES OF TAXONOMIC monographs on the ichneumon flies of America North of Mexico, is being prepared under a project supported by the Dow Chemical Company, the University of Michigan, and the National Science Foundation.

The basic financial support for this work has come from the Dow Chemical Company. The University of Michigan has given working space and facilities, and a grant from the National Science Foundation has met such costs as travel, typing, and the preparation of figures. We are grateful for the opportunity thus provided for carrying the work forward.

Numerous colleagues and the collectors of earlier generations have accumulated a mass of material which has made a reasonably complete record of our fauna possible. Some of the more important collections were made by C. F. Baker in Colorado and elsewhere; Nathan Banks in Virginia and Massachusetts; P. P. Babiy at Ithaca, N. Y.; G. E. Bohart and R. M. Bohart in California and Utah; J. C. Bradley in British Columbia, California, and New York; Frank De Gant in Ohio; R. R. Dreisbach in Michigan and other States; P. W. Fattig in Georgia; H. R. Foxlee at Robson, B. C.; R. M. Fouts in the vicinity of the District of Columbia; J. N. Knull in Ohio and elsewhere; W. R. M. Mason in Canada, particularly in the far north; A. L. Melander in the northwestern States; C. E. Mickel in Minnesota; J. G. Rempel in Saskatchewan; H. C. Severin in South Dakota; A. T. Slosson on Mount Washington, N. H.; H. H. Smith in Alabama and Pennsylvania; E. H. Strickland in Alberta; David Townes in Arizona, California, Colorado, and Alaska; George Townes in California, Colorado, and South Carolina; E. P. Van Duzee near Buffalo, N. Y.; and G. S. Walley in Canada. The names of some of the many other collectors appear in the statements on the distribution of the various species. The combined efforts of these collectors, together with our own, have furnished the raw data for this study and for the papers to follow on other parts of the family. Part of our own collecting, that in Arizona, California, and Colorado in 1947 and 1948, was supported by grants from the American Philosophical Society.

The curators of North American collections have been uniformly helpful in making the material under their care available, and we wish to express our thanks to them. Miss Luella Walkley of the U. S. Department of Agriculture, and Mr. J. F. Perkins of the British Museum (Natural History) have, on several occasions, supplied technical information which was needed in the course of the study. The drawings of generic characters were made by Mr. M. Tsujita and those of specific characters mostly by Miss Y. Morimoto, under the direction of Dr. M. Tokunaga of Kyoto, Japan. The habitus drawings of two typical Metopiinae (figure 163) are by Miss M. McKay of the Division of Entomology, Canadian Department of Agriculture, and kindly lent to us for inclusion in this publication. The maps showing the distribution of the species were prepared by Mrs. Rae Stauffer. The manuscript was typed by Mrs. Stauffer and by Mr. Duwane Barnes.

Materials Studied

An effort has been made to study the material in all of the large North American collections, and since the curators contacted were obliging in the loan of material, this has largely been accomplished. The ichneumonid collections studied are listed below.

Academy of Natural Sciences of Philadelphia,
  Philadelphia, Pennsylvania
American Museum, New York, New York
California Academy of Sciences, San Francisco, California
Canadian National Collection, Ottawa, Ontario
Carnegie Museum, Pittsburgh, Pennsylvania
Cornell University, Ithaca, New York
Dreisbach Collection, Midland, Michigan
Harvard University, Cambridge, Massachusetts
Michigan State University, East Lansing, Michigan
Ohio State University, Columbus, Ohio
Oregon State College, Corvallis, Oregon
Townes Collection, Ann Arbor, Michigan
U. S. National Museum, Washington, District of Columbia
University of Alberta, Edmonton, Alberta
University of California, Berkeley, California
University of California at Davis, Davis, California
University of Kansas, Lawrence, Kansas
University of Michigan, Ann Arbor, Michigan
University of Minnesota, St. Paul, Minnesota
University of Wisconsin, Madison, Wisconsin

We have studied all the types of genotypes, and of Nearctic forms, known to be in existence.

Where it is of interest, as in the case of types or unusual specimens, the location of particular specimens has been shown in the text by including (in parentheses) an indication of the collection housing them. For private collections the name of the owner has been used as this indication, but for the public collections the name of the city of the institution. The name of the city is thought to be a more convenient and stable designation in such cases than the name of the institution, as institutional names tend to change, and are usually more complex than city names.

The holotypes belonging to the Townes and Dreisbach collections are being deposited in the U. S. National Museum.

Localities

All localities on the pin labels of specimens studied are listed under each species and, except for indefinite localities like a state or other large area, are spotted on the distribution maps. Localities easy to find in atlases or to be found in the U. S. Postal Guide are listed only by name. The others usually have their counties given. Localities which we could not find are in quotes. Unverified distributional (or host) data in literature are not repeated, as this report is restricted, so far as possible, to first-hand information.

Bibliography

Primary references concerning nomenclature of the Nearctic forms have all been given, but except for the occasional references to the biology, the others have been omitted. The omitted references are believed to be of only historical importance, and if the student is interested in them, all those published prior to 1943 may be found in a recent catalog (Townes, 1945, Mem. Amer. Ent. Soc., vol. 11).

Terminology

Smith and Shenefelt (1956, Trans. Wisconsin Acad. Sci. Arts, Lett., vol. 44, pp. 168, 200–219) have published diagrams illustrating most of the taxonomic terms commonly used for Ichneumonidae. Their paper will answer most questions on terminology that may arise. Our usage varies from theirs in a few instances as follows: EPOMIA and NOTAULUS are used in place of their "opomia" and "notaulix", as being more generally used terms and more correct from the standpoint of Greek derivation; in regard to notaulus in particular, see Forbes' remarks (1940, Bull. Brooklyn Ent. Soc., vol. 35, pp. 136–137).

CHEEK is used for the space between the eye and the base of the mandible ("malar space" of Smith and Shenefelt). TEMPLE is used for the space between the hind margin of the eye and the occipital carina ("gena" of Smith and Shenefelt). CLASPER is the outer lateral piece of the male genitalia ("paramere" of Smith and Shenefelt). The EPIPLEURUM (not in the Smith and Shenefelt diagrams) is the thin free flange attached to the lower margin of an abdominal tergite and usually sharply turned mesad to cover part of the lower side of the abdomen laterally. The ORBIT is the part of the head next to the eye. The orbit is divisible into regions, with self-explanatory terminology, like frontal orbit, hind orbit, lower hind orbit, etc.

The spelling pleurum, rather than pleuron, is preferred in this paper. Pleurum comes from the Greek "pleuron", meaning side. It is a word similar to notum and sternum, which come from "noton" and "sternon". All three Greek words have the neuter singular ending "-on", which when brought into English may be transliterated as *-on* or given as the Latin neuter singular ending *-um*. It is strange that "noton" and "sternon" have come to be spelled notum and sternum in English, while the structure between them, coming from a Greek word with the same ending, is more often spelled pleuron than pleurum. Either the *-on* or the *-um* ending would be linguistically acceptable for any of the three, but since they are for adjacent structures and are often used together, simplicity suggests that the choice of endings should be the same in all three cases.

Counts and Measurements

In counting the abdominal segments, we (like Smith and Shenefelt) start with the first apparent segment rather than with the first morphological segment. The propodeum (the morphological first segment of the abdomen) is included as a part of the thorax, which it is from a functional standpoint.

Heavy use is made of measurements in the keys and descriptions, not because we are fond of them or because they are unusually constant, but because they seem to be the most convenient way to express the differences of relative size and proportion which must be relied on for many distinctions. A multitude of drawings would be the only other practical method for showing these differences. In measurements of proportions, like length in relation to width, we have used a microscope with an ocular micrometer for the measurements and a slide rule for the computations. The resulting figures express differences that are evident to the practiced eye when comparison material is available, and need not be checked by measurement in such cases, but without comparison material one must usually measure rather exactly with a microscope and ocular micrometer, and do the necessary arithmetic for getting proportions. Uneducated guesses tend to lead one astray.

The length of a structure is ordinarily measured as its greatest visible length, disregarding parts of it that may be hidden in a socket or articulation. The width or depth is measured at its greatest width or depth, disregarding hairs. The length of the front wing is taken from the free edge of the tegula to the extreme apex of the wing. The length of the first tergite is taken from the center of the insertion of its dorsal (extensor) tendon to its apex. The width of the face is taken at its NARROWEST point between the eyes. The height of the face is measured from the center of the clypeal foveae (=anterior tentorial pits) to the lower margin of the antennal sockets.

The descriptions of the various aspects of the legs are as if they were extended horizontally at right angles to the body. Thus the top and bottom edges and the front and rear faces of a structure like the hind tibia would be different than if it were in the normal position for walking. In order to arrive at a definite and uniform terminology, it seems necessary to imagine the unnatural position of all legs being stretched horizontally at right angles to the body, even if it seems confusing at first, because the natural position of the legs differs between the front, middle, and hind legs, and puts many of the segments in an oblique position.

The wing membrane of most Nearctic Metopiinae is hyaline or almost so, and the wing veins and stigma are fuscous. In *Metopius* there are various wing colors, which give good taxonomic characters, so the wing color in *Metopius* has been described for each species. For all other species it may be assumed to be approximately hyaline with dark veins and stigma, unless described otherwise.

1. Subfamily Metopiinae

Subfamily Metopiinae

THE ICHNEUMON FLIES which are the subject of this paper are stout-legged species, with a stout cylindric body, clypeus not separated from face by a groove, scape ovoid (about 1.2 to 1.7 as long as wide), spiracles of first abdominal segment at or in front of its midlength, areolet absent or of the triangular type (though seldom really triangular), ovipositor not protruding beyond end of abdomen, and usually the second trochanter of the front and middle legs fused with their femora. Their clypeus and face together form a bulging, convex surface except in the genus *Metopius*, in which the face has a large, flat or concave, escutcheon-shaped area. The upper margin of the face is produced into a triangular process which extends between or over the bases of the antennal sockets. This latter character occurs, with variations, throughout the subfamily and is its most distinctive single characteristic. The general habitus of the subfamily is illustrated by the figures of the various genera (figs. 163 to 177).

This subfamily stood taxonomically for many years as three separate tribes in the subfamily Tryphoninae: the Metopiini, the Tylocomnini (or Trachydermatini), and the Exochini. Several authors had noted points of similarity between these tribes, and in 1945 they were grouped together as a single subfamily, separate from the Tryphoninae (Townes, 1945, Mem. Amer. Ent. Soc., vol. 11, pp. 570–588). A few genera which have been assigned to the Metopiinae or to the tribes united to form the subfamily, do not fit the above definition of the subfamily. These, which we believe are properly assigned elsewhere, are discussed below.

Hyperacmus disagrees with the Metopiinae in lacking the interantennal process of the frons; in having a sharp groove between the clypeus and face, second trochanter of front and middle legs distinct, a different style of carination on propodeum; and in some other, more subtle, characters. Townes (1945, Mem. Amer. Ent. Soc. vol. 11, p. 545) has referred *Hyperacmus* to the Plectiscinae, next to *Microleptes*, which appears to be its proper position. The genus *Ibornia*, referred by its author to the Metopiinae, is a member of the Tryphonini, near *Ctenochira*.

Thibetoides is a genus of Tryphoninae in the strict sense. It has recently been redescribed and figured by the authors (1949, Trans. Ent. Soc. Amer. vol. 52, p. 418). *Catocentrus* is a synonym of *Monoblastus*, a genus of the Tryphoninae. The genotype of *Catocentrus* has been redescribed by the authors (ibid., p. 414). *Lethades* is a synonym of *Trematopygus*, a genus of Scolobatinae (see Townes, 1945, Mem. Amer. Ent. Soc. vol. 11, p. 484).

Ischyrocnemis appears to belong in the Scolobatinae and *Strongylopsis* in the Ephialtini. Heinrich (1949, Mitt. Münchner Ent. Gesl., vol. 25–29, p. 13) has recently referred *Alomya* to the Metopiinae, basing his opinion, as he has informed us in conversation, on certain morphological resemblances and on the fact that *Alomya* is like *Metopius* in its habit of buzzing like a wasp when caught. *Alomya* is an aberrant genus whose systematic position has long been a subject of speculation, but to us seems to belong near *Colpognathus*, in the subfamily Ichneumoninae, and to represent an extreme development along the evolutionary line leading through *Centeterus*, to *Colpognathus*, to *Pseudolomya*, *Megalomya*, and *Alomya*.

The elimination of the above genera reduces the content of the Metopiinae to a morphologically and biologically cohesive group, recognizable on the characters listed above. Within the subfamily there are several natural groups of genera, to which attention should be called. *Pseudometopius*, *Acerataspis*, *Chorinaeus*, *Trieces*, and *Hemimetopius* are related, and differ from other Metopiinae in having the epipleura vestigial, the front and middle tarsal claws pectinate, and the male with six or seven and the female with six well exposed abdominal tergites. These five genera are further divisible into two natural groups as indicated in couplet 3 of the key to genera. Some species of *Metopius* also have the front and middle tarsal claws pectinate, and *Metopius* also has seven well exposed tergites in the male and six in the female, but all species of *Metopius* have well developed epipleura, and the genus appears to be an isolated one. The rest of the subfamily is composed of a loose group of genera, within which is a small distinct subgroup including *Triclistus*, *Cubus*, and *Colpotrochia*. These three genera have a distinctive type of carina between the antennal sockets, a distinctive type of female subgenital plate, and the female abdomen with retracted apical segments. *Spudaeus* is somewhat similar to these three in the female abdomen and subgenital plate, but does not have the characteristic type of carina between the antennal sockets. The rest of the genera constitute a loose and hardly definable third subgroup, which may be arranged in a series with individual and progressive specialization, leading ultimately to *Exochus* as the most specialized genus of the subfamily.

Biology and Distribution

The only information on the biology of the Nearctic species of this subfamily is in the data on hosts and ecology on the pin labels of specimens, some field notes and memories about our own collections, and single scraps of published information on four of the species. There have been no detailed biological studies. Piecing together the available information, some general conclusions about the biology of the group may be developed. Though presentation of such generalizations is at the risk of glossing over a profound ignorance, they are given for what they may be worth as starting points for future investigators.

The Metopiinae are all parasitic on Lepidoptera. There are a few records of other hosts, but these need verification. Oviposition is into the host larva, apparently a considerable time prior to pupation, but emergence is always from the pupa. At its pupation the parasite larva spins a few strands of silk to form a flimsy cocoon within the host pupa. Emergence is by cutting off the front end of the host pupa as a cap-like lid. A single adult develops in each host.

Seasonal records of capture show that a few species have a single generation in the spring or fall, but many are on the wing from late spring to early fall and apparently have at least two generations a year. Overwintering is always within the host pupa.

The kinds of Lepidoptera that serve as host are correlated with the size and habitat of the adult ichneumon-fly. Large species like *Metopius* parasitize larger Lepidoptera, but most of the species of Metopiinae are small, and their usual hosts are among the pyraloids and tortricoids. Lepidoptera which live next to the soil or pupate deep in it, or spin tough cocoons, or live in tunnels—these do not seem to serve as hosts; but exposed larvae and larvae in leaf rolls or leaf folds are commonly attacked. A single species of parasite usually may be reared from a number of hosts that occur within its habitat and size range. There are doubtless some cases of restricted host specificity, but the rearing records at hand do not prove any.

The larval morphology of the subfamily is known only through illustrations of the mouthparts of *Metopius* and of *Triclistus*, published by Beirne (1941, Trans. Soc. Brit. Ent., vol. 7, pp. 160–162).

We have the impression that the metopiines locate their hosts mainly by flying, hovering just to leeward of the hosts and finding them by smell, rather than by crawling over vegetation and exploring with their antennae as do the Gelinae and Ichneumoninae.

Mating has never been observed in the field. Sometimes loose groups of males have been found hovering around a bush or the ends of a branch, just under the tips of the leaves. Possibly they were in a primitive sort of mating swarm and waiting for females to appear. This habit has been seen in several species of *Exochus*, in *Colpotrochia crassipes*, and in *Metopius krombeini krombeini*.

Many of the metopiines frequent more open, drier habitats than the majority of ichneumonids. This is particularly true of *Metopius*, *Trieces*, and *Chorinaeus*. *Exochus*, *Triclistus*, and *Colpotrochia*, however, seem to be mostly in forests, and the *pictus*, *montivagus*, and *tibialis* species groups of *Exochus* are mostly in damp forests.

The subfamily is generally distributed through the world, from the arctic to the tropics, in dry and in wet climates, and in all the larger faunas. All the larger genera (*Chorinaeus*, *Trieces*, *Metopius*, *Triclistus*, *Colpotrochia*, *Hypsicera*, and *Exochus*) are essentially worldwide, though *Hypsicera* is represented in the Neotropics by only two introduced species. The smaller genera also tend to have a wide range. All but three of the known genera and three of the subgenera occur in the Nearctic Region, a fact which has prompted the inclusion of the missing ones in this revision, to make the generic and subgeneric treatment worldwide in scope.

Key to the genera of Metopiinae

1. Face occupied largely by a flat or concave escutcheon-shaped area bounded by a carina (figs. 166,b–169,b); middle tibia with one spur. Worldwide. **6. Metopius** (p. 59)

   Face entirely convex; middle tibia with two spurs except in male of *Acerataspis* 2

2. Epipleura of third to fifth abdominal tergites apparently absent (represented by narrow, inconspicuous vestiges); front and middle tarsal claws conspicuously pectinate 3

   Epipleura of third to fifth tergites well developed; front and middle tarsal claws usually apparently simple 7

3. Areolet present; interantennal process of face forming a high semicircular flange between antennal sockets; second abdominal tergite with a pair of median longitudinal carinae; seventh tergite of male retracted; hind tarsal claws conspicuously pectinate; front wing 7 to 10 mm. long . . . 4

   Areolet absent; interantennal process of face forming a triangular projection in front of antennal sockets, but not a high flange between them; second abdominal tergite with a median longitudinal carina (except in the European *Chorinaeus talpa*) and often also with sublateral longitudinal carinae; seventh tergite of male exposed; hind tarsal claws apparently simple; front wing 2.6 to 7 mm. long 5

4. Abdomen parallel-sided, the fifth and sixth segments not wider than the preceding segments, and the apex of the sixth segment not specialized (fig. 164,a); middle tibia of male with two spurs. Eastern Nearctic and eastern Palaearctic . . . . **1. Pseudometopius** (p. 8)

   Abdomen clavate, the fifth and sixth segments much wider than the preceding segments, the apex of the sixth segment subspherically rounded (fig. 164,b); middle tibia of male with one spur. Oriental . . **2. Acerataspis** (p. 11)

5. Scutellum quadrate, its lateral carina strong and produced apically into a prominent tooth; abdomen clavate, progressively enlarged from its base to the fourth and fifth segments; posterior mesosternal carina complete, not interrupted in front of each middle coxa. Ethiopian. **5. Hemimetopius** (p. 59)

   Scutellum parabolic in outline, its lateral carina low, rarely produced apically as a small tooth; abdomen parallel-sided; posterior mesosternal carina interrupted in front of each middle coxa 6

6. Upper edge of pronotum paralleled by a broad, shallow, submarginal groove (fig. 165,a); sublateral longitudinal carina of abdomen extending at most to basal third of second tergite, entirely absent from third tergite (fig. 165,a); mesopleural suture present. Worldwide---------- **3. Chorinaeus** (p. 12)

   Upper edge of pronotum without a distinct submarginal groove (fig. 165,b); sublateral longitudinal carina of abdomen extending the entire length of second tergite (except in *Trieces teres*), present also on third tergite, at least basally (except in *Trieces teres*) (fig. 165,b); mesopleural suture absent. Worldwide------------------------------------ **4. Trieces** (p. 34)

7. Hind tibia with one apical spur; flagellum enlarged beyond the middle (weakly clavate, fig. 172). Holarctic . . . . **10. Periope** (p. 136)

   Hind tibia with two apical spurs; flagellum not enlarged beyond the middle . 8

8. Antennal sockets separated by a high lamella, the lamella with a deep median groove dorsally (just below median ocellus) 9

   Antennal sockets not separated by a high lamella, or when a lamella is present it does not have a median groove 11

9. Propleurum somewhat cubical in shape, shaped about like the front coxa (fig. 170,b); head in profile concave between hind ocellus and occipital carina. Neotropic . . . . **9. Cubus** (p. 135)

   Propleurum not cubical, weakly convex (figs. 170,a; 171,a); head in profile flat or convex between hind ocellus and occipital carina 10

10. First abdominal segment broad basally, its spiracle near its basal 0.25, its sternite extending about 0.2 its length; propodeum with distinct dorsal and posterodorsal faces (fig. 170,a); head somewhat cubical; edge of interantennal lamella arcuate in profile. Worldwide . . **7. Triclistus** (p. 107)

    First abdominal segment narrow basally, its spiracle near its basal 0.37 to 0.5, its sternite extending 0.3 to 0.5 its length; propodeum without distinct dorsal and posterodorsal faces, these blending in an even curve (fig. 171,a); head lenticular; edge of interantennal lamella angulate in profile. Worldwide . . . . **8. Colpotrochia** (p. 127)

11. Areolet present 12

    Areolet absent 15

12. Occipital carina entirely absent; propodeal spiracle round. Holarctic and New Zealand. **16. Carria** (p. 154)

    Occipital carina present; propodeal spiracle elongate 13

13. Epipleurum of second abdominal segment large, conspicuous, at least 0.3 as wide as its tergite (fig. 179,a); spiracle of first tergite just above lateral carina. Nearctic and Indo-Australian . . . . . **15. Seticornuta** (p. 150)

    Epipleurum of second abdominal segment narrow, inconspicuous; spiracle of first tergite just below lateral carina 14

14. Metapleurum with hairs over its entire surface; notaulus absent; sixth tergite of female mostly retracted into fifth; front wing 9.0 to 11.5 mm. long. Holarctic . . . . **11. Spudaeus** (p. 138)

    Metapleurum without hairs; notaulus short but distinct; sixth tergite of female projecting distinctly beyond the fifth; front wing 5.0 to 6.7 mm. long. New World . . . . **14. Leurus** (p. 147)

15. Second abdominal tergite with a median pair of longitudinal carinae, at least at its base (figs. 173,a and 176,b); second recurrent vein meeting cubitus almost at the intercubitus, the second abcissa of cubitus being less than 0.25 the length of intercubitus; metapleurum densely hairy all over; temple short 16

Second abdominal tergite without median longitudinal carinae; second recurrent vein meeting cubitus considerably before the intercubitus, the second abcissa of cubitus being more than 0.3 as long as intercubitus; metapleurum usually bare or with only a few hairs; temple rather long . 17

16. First abdominal tergite in profile evenly convex (fig. 176,b); epipleura of fifth and sixth abdominal segments weakly or indistinctly separated from their tergites; subtegular ridge rounded, in rear view with an excavation that makes it appear to be folded over. Nearctic. **12. Bothromus** (p. 142)

First abdominal tergite in profile pyramidal (fig. 173,a); epipleura of fifth and sixth abdominal segments sharply separated and sharply folded under; subtegular ridge sharp, without an appearance of being folded over. Old World . . . . **13. Drepanoctonus** (p. 145)

17. Interantennal process of face separated from face by a prominent transverse carina (fig. 177,a); lower half of propleurum subspherically swollen (fig. 177,a). Holarctic and Oriental . . . . **19. Stethoncus** (p. 167)

Interantennal process of face not separated from face by a carina (figs. 175; 176,a; 177,b) 18

18. Back of head vertical behind posterior ocelli (fig. 176,*a*); face in profile sloping forward to its upper margin; spurs of middle tibia of approximately equal length. Worldwide . . . . **18. Hypsicera** (p. 160)

Back of head sloping from posterior ocelli to the level of the occipital carina, thence approximately vertical to the foramen magnum 19

19. Epipleurum of third tergite very narrow, about as wide as the flagellum; cheek about 0.8 as long as the mouth opening is wide (fig. 175,a); spurs of middle tibia of approximately equal length. Nearctic. **17. Macromalon** (p.158)

Epipleurum of third tergite well developed, about 0.25 to 0.7 as wide as its tergite; cheek not more than 0.5 as long as the mouth opening is wide; spurs of middle tibia unequal in length 20

20. Front spur of middle tibia longer than hind spur of middle tibia; median longitudinal carinae of propodeum approximate or fused medially, resulting in the basal area and areola being well separated (fig. 175,b); interantennal process of face weakly notched at apex (fig. 175,b). Nearctic. **20. Synosis** (p. 169)

Front spur of middle tibia shorter than hind spur of middle tibia (except in one Australian species); median longitudinal carinae of propodeum, when present, not approximate or fused medially (fig. 188,a–k); interantennal process of face nearly always pointed medially (fig. 179,g–o). Worldwide. **21. Exochus** (p. 170)

1. Genus Pseudometopius

FIGURE 164,a

Pseudometopius Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 202. Type: *Metopius hagenii* Cresson; monobasic.

Tylocomnoides Uchida, 1940, Trans. Sapporo Nat. Hist. Soc., vol. 16, p. 178. Type: *Tylocomnoides egawai* Uchida; original designation.

Odontotylocomnus Uchida, 1940, Trans. Sapporo Nat. Hist. Soc., vol. 16, p. 179. Type: *Odontotylocomnus pilosus* Uchida; original designation.

Front wing 8 to 10.5 mm. long; body punctation rather strong; face and clypeus weakly convex, with surface irregularities; face continued dorsally between antennal sockets as a narrowly triangular process which becomes a lamella at its dorsal end, the process reaching about 0.4 the distance to median ocellus; temple moderately long, convex; occipital carina absent or complete; cheek about 0.4 as long as basal width of mandible; upper margin of pronotum not swollen or specialized, with an indistinct submarginal impression; propleurum moderately convex; scutellum large, a little transverse, with lateral flanges that reach its apex; areolet present, large; nervulus beyond basal vein by 0.18 to 0.35 its length; nervellus broken between its lower 0.35 and upper 0.4; prepectal carina as shown in figure 164,*a*; sternaulus represented by a rather strong, broad groove; metapleurum completely covered with rather coarse close punctures; propodeal carinae as in figure 164,*a*; propodeal spiracle short elliptic; suture between second trochanter and femur of front and middle legs distinctly indicated; tibial spurs all present, the spurs of middle tibia of equal length or the front spur a little longer; all tarsal claws with long pectination; abdomen parallel-sided, strongly convex; first tergite short and stout, its spiracle at its basal 0.25, its lateral longitudinal carina absent, its median longitudinal carinae extending usually to apex; second and third tergites and more or less of fourth tergite sometimes with a pair of median longitudinal carinae; epipleura vestigial, narrow and thick; seventh and following tergites retracted in both sexes; sixth sternite of female rectangular, unspecialized.

There are three known species, one in eastern North America and two in Japan. The three species are widely different from one another, and Uchida has erected a genus for each of the Japanese species, as noted in the generic synonymy. The generic description is based only on *P. hagenii* and *P. pilosus.*

Pseudometopius hagenii (Cresson)

FIGURE 164,a

Metopius Hagenii Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 168; ♀. Type: ♀, Dallas Co., Tex. (Cambridge).

Front wing 9 to 10 mm. long. Face with broad weak irregularities and close punctures of various sizes; occipital carina complete; mandible rather broad, unspecialized, its apical teeth of equal size; flagellum long and slender; thorax with close punctures that are rather small but strong; spurs of middle tibia of equal length; nervellus broken near its upper 0.45; abdomen with coarse strong punctures, its second and third tergites and more or less of fourth tergite with a pair of median longitudinal carinae.

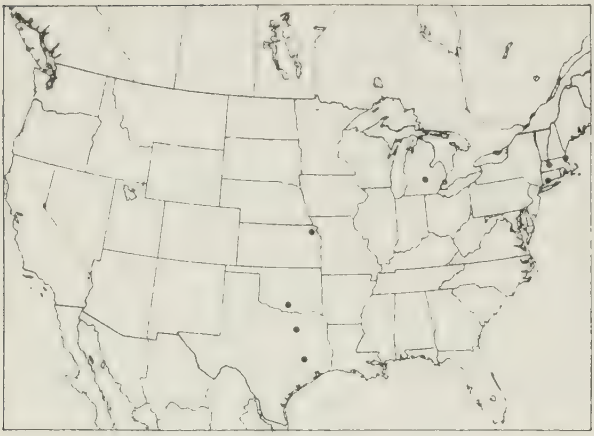


FIGURE 1.—Localities for *Pseudometopius hagenii.*

Black. Face and clypeus (except in male for a small ventromedian spot and spot on clypeal fovea, and except in female for a broad median stripe from clypeal margin to base of interantennal process and the dorsolateral corner of face), narrow frontal orbits on lower 0.6 of frons of female, broad and complete frontal orbits in male, cheek, mouth parts, spot on front of scape, spot on upper part of prepectus (in male connected with subtegular ridge), subtegular ridge, front and outer part of tegula, hind part of scutellum, apical part of front and middle coxae of male, front and middle trochanters of male, apical margin of front and middle trochanters of female, second trochanter of hind leg of male, front and middle femora of male in front and apically, front and middle femora of female apically, front and middle tibiae except from dark brown area below, and hind tibia on its basal half with an extension on upper edge to near apex, white; tegula brown except where described as white; wing membrane subhyaline to weakly infuscate; tibial spurs whitish; front and middle tarsi whitish, each segment light brown apically; first segment of hind tarsus mostly whitish, its apex blackish; second to fifth segments of hind tarsus fuscous, a little paler basally.

Specimens: ♂, New Haven, Conn., May 30, 1911, A. B. Champlain (Washington). ♂, ♀, Baldwin City, Kans., May, J. C. Bridwell (Washington). ♂, Amherst, Mass., May 1936, R. B. Peckham (Washington). ♂, Lynn, Mass., Aug. 1908 (Townes). ♂, Mass. (Philadelphia). ♂, East Lansing, Mich., June 3, 1895 (Philadelphia). ♀, Davis, Okla., Apr. 30, 1936 (Ottawa). ♀, Brazos Co., Tex., April. 9, 1941, R. W. Strandtmann (Townes). ♀ (type) Dallas Co., Tex. (Cambridge). 2 ♀, Texas, Belfrage Collection (Washington). ♂, 3♀, Texas (Philadelphia and Washington).

This species ranges from the Atlantic to Texas, in the Transition and Upper Austral zones. Most of the specimens were collected in spring.

2. Genus Acerataspis

FIGURE 164,b

Cerataspis Uchida, 1934, Trans. Sapporo Nat. Hist. Soc., vol. 13, p. 275; name preoccupied by Gray, 1828. Type: *Cerataspis clavata* Uchida; original designation.

Acerataspis Uchida, 1934, Ins. Matsumurana, vol. 9, p. 23; new name for *Cerataspis.*

Front wing 7 to 9 mm. long; punctation rather strong; face and clypeus evenly, moderately convex; face continued dorsally as a narrow, high triangular process extending 0.7 the distance to median ocellus, the process a thin lamella subdorsally, expanded a little on its dorsal edge and its dorsal edge with a deep groove; temple very short, mostly flat; occipital carina complete; cheek about 0.4 as long as basal width of mandible; mandible moderately narrow, unspecialized, its upper tooth a little larger than lower tooth; flagellum long and slender; upper margin of pronotum rather obliquely thickened and a little flattened submarginally; propleurum moderately convex; scutellum short, transverse, prolonged lateroapically as a tooth, its lateral carina running to the apex; areolet large; nervulus opposite basal vein or a little beyond it; nervellus broken near its lower 0.4; prepectal carina as in the figure; sternaulus a broad impression; metapleurum completely covered with fine setiferous punctures; propodeal carinae as in the figure; propodeal spiracle short oval; suture between second trochanter and femur of front and middle legs faintly indicated on lower side; middle tibia with a single slender spur in male, with two slender spurs in female, the front spur of female middle tibia about 1.1 as long as hind spur; hind tibia with two spurs; all tarsal claws with long pectination; abdomen strongly convex, clavate, its apex rounded with the sixth tergite rounded and turned under; first tergite moderately short, its spiracle near its basal 0.25, its lateral carina absent or weakly indicated; first three tergites with a pair of median longitudinal carinae from base to apex; epipleura vestigial, narrow and thick; seventh and following segments retracted; sixth sternite of female a transverse, unspecialized plate.

This genus contains a small number of species in the Oriental region. *Metopius fusiformis* Morley 1913, should be referred to this genus (new combination). We have specimens from Java and the Moluccas which agree exactly with Morley's type, and an undescribed subspecies of *A. fusiformis* from the Philippines.

3. Genus Chorinaeus

FIGURES 163,a; 165,a

Chorinaeus Holmgren, 1856, Svenska Vetensk. Akad. Handl., ser. 4, vol. 1, p 305, 320. Type: *Exochus funebris* Gravenhorst; designated by Viereck, 1914.

Polyrhabdus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 98. Type: (*Polyrhabdus cariniger* Walsh) =*funebris carinatus* (Cresson); monobasic.

Front wing 3 to 7 mm. long; body punctation rather coarse; face and clypeus with an even, moderately strong convexity, the face produced upward over bases of antennae as a triangular flange whose apical angle is about 90°; frons without a lamella between antennal sockets; temple short, convex; occipital carina present above and laterally, absent below; mandible of moderate size, not specialized, its lower tooth a little smaller than or definitely smaller than upper tooth; flagellum slender, moderately long to long; upper margin of pronotum widened, with a broad, weak, submarginal impression; propleurum moderately convex; scutellum parabolic in outline, almost flat, its lateral carina sharp and extending to its apex; areolet absent; nervulus beyond basal vein by about 0.2 to 0.35 its length; nervellus broken near its lower 0.35; prepectal carina as in figure 165,a; sternaulus a short, weak depression next to prepectal carina; mesopleural suture distinct, usually sharp; metapleurum with hairs in the upper part, elsewhere mostly or quite bare; propodeal carina as in figures 163,a and 165,a, the costula usually absent though occasionally more or less distinct (the costula appears sporadically in specimens of several species and seems to be taxonomically of little value); propodeal spiracle short elliptic; suture between second trochanter and femur of front and middle legs distinct, though weak; tibial spurs all present; front spur of middle tibia 0.60 to 1.0 as long as hind spur of middle tibia; claws of front and middle tarsi strongly pectinate, of hind tarsus apparently simple; abdomen strongly convex above, parallel-sided; first tergite moderately long, its spiracle near its basal 0.25, its lateral and median longitudinal carinae strong from base to apex; second tergite with a median longitudinal carina extending its entire length and a sublateral longitudinal carina extending about 0.4 its length; third tergite with a median longitudinal carina extending about 0.7 its length; epipleura vestigial, narrow and thick; eighth and following tergites of male retracted; seventh and following tergites of female retracted; sixth sternite of female large, weakly sclerotized, unspecialized.

The European *Chorinaeus talpa* (Haliday) 1839 lacks the carinae on the second and third tergites but is otherwise typical of the genus.

The coloration in the genus is rather uniform, usually black with yellow face, mouth parts, cheek, basal part of tegula, apex of femora, basal 0.2 of tibiae and some other, usually more vague, leg markings, pale yellow. The legs are mostly fulvous or ferruginous with the hind coxa frequently blackish. The wings of all Nearctic species are hyaline with the stigma and veins dark, but the veins at the wing bases yellow. Variation in details of head and leg coloration give specific characters.

This genus is worldwide, but with only a moderate number of species. There are ten in the Nearctic region. Adults occur in rather open, dry situations, usually among shrubs or low trees.

Most species of *Chorinaeus* are difficult to distinguish, requiring careful consideration of some rather small and variable specific differences. Possibly not all of the species in the material studied have been recognized and adequately characterized, but a better treatment probably must wait for better study series. We have a residue of 11 Nearctic specimens not assigned to any species, and though the majority belong probably to *Chorinaeus funebris*, there may be some additional new species among them.

Key to the Nearctic species of Chorinaeus

MALES

(The males of *emorsus* and *labiosus* are unknown.)

1. Pronotum with small setiferous punctures from its dorsal margin down almost to its trough; longitudinal carinae of first tergite that are just above and below the spiracle meeting apically in about a 25° angle; propodeal spiracle usually nearer lateral carina than pleural carina; front wing 4.5 to 7.0 mm. long; hind coxa black, paler apically . . . . . . **1. longicalcar** Thomson
   Pronotum with small setiferous punctures from its dorsal margin down about 0.66 the distance to its trough; longitudinal carinae of first tergite just above and below the spiracle meeting apically in about a 45° angle; propodeal spiracle not nearer lateral carina than pleural carina; front wing 3.0 to 5.5 mm. long 2
2. Apex of penis with 4 to 15 strong bristles on each side 3
   Apex of penis without bristles 4
3. Second segment of middle tarsus about 1.3 as long as wide; front spur of middle tibia about 1.0 as long as hind spur; apex of penis with 7 to 15 bristles on each side . . . . **2. aequalis,** new species
   Second segment of middle tarsus about 2.5 as long as wide; front spur of middle tibia about 0.75 as long as hind spur; apex of penis with 4 to 6 bristles on each side . . . . **3. excessorius** Davis
4. Mandible 1.8 to 2.1 as long as wide, its upper tooth a very little larger and and longer than its lower tooth; hind coxa largely or entirely blackish . . 5
   Mandible 2.1 to 2.2 as long as wide, its upper tooth distinctly larger and longer than its lower tooth; hind coxa ferruginous to black, usually fulvous 6
5. Flagellum with about 28 segments; yellow on frons extending upward to a little above center of eye emargination; body punctation moderate.
   4. californicus Ashmead

Flagellum with about 36 segments; yellow on frons extending upward to just below center of eye emargination; body punctation rather strong.
5. opacitas Davis

6. Punctures on outer face of mandible rather fine; punctures on central part of face rather fine and weak, their interspaces about equal to their diameter.
8. recurvus, new species

Punctures on outer face of mandible coarse; punctures on central part of face moderate, their interspaces about 0.6 their diameter 7

7. Face about 1.2 as high (measured from center of clypeal fova to lower edge of antennal socket) as the mouth is wide (measured between bases of mandibles); side of frons yellow upwards to center of eye emargination; front wing 3.0 to 3.8 mm. long . . . . **6. constrictus** Davis

Face about 0.8 to 1.0 as high as mouth is wide; frons usually without yellow laterally, but when there is yellow laterally, it usually does not extend upward to center of eye emargination; front wing 2.9 to 5.4 mm. long.
7. funebris (Gravenhorst)

FEMALES

1. Pronotum with small punctures from its dorsal margin down almost to its trough; longitudinal carinae of first tergite just above and below the spiracle meeting apically in about a 25° angle; propodeal spiracle usually nearer lateral carina than pleural carina; front wing 4.5 to 7.0 mm. long; face black, yellow next to eye and on the interantennal process (figs. 178,a,b).
1. longicalcar Thomson

Pronotum with small punctures from its dorsal margin down about 0.66 the distance to its trough; longitudinal carinae of first tergite just above and below the spiracle meeting apically in about a 45° angle; propodeal spiracle not nearer lateral carina than pleural carina 2

2. Upper tooth of mandible about 1.5 times as large as lower tooth; mandible about 1.85 to 2.0 as long as wide 3

Upper tooth of mandible about 3 times as large as lower tooth; mandible about 2.1 to 2.7 as long as wide 5

3. Face blackish medially (fig. 178,f); second segment of middle tarsus about 1.35 as long as wide . . . . **5. opacitas** Davis

Face entirely yellow (figs. 178,d,e); second segment of middle tarsus about 2.25 as long as wide 4

4. Hind coxa entirely fulvous . . . . **3. excessorius** Davis

Hind coxa blackish, fulvous apically . . . . . . **4. californicus** Ashmead

5. Apical margin of clypeus strongly concave (fig. 178,l).
10. emorsus, new species

Apical margin of clypeus almost straight or faintly concave (figs. 178,c,g,h,j,k) 6

6. Front spur of middle tibia almost exactly as long as hind spur of middle tibia; face entirely yellow (fig. 178,c); side of frons yellow to above center of eye emargination . . . . **2. aequalis,** new species

Front spur of middle tibia not more than 0.85 as long as hind spur of middle tibia; face usually partly dark (figs. 178,g–k) 7

7. Clypeus blackish (figs. 178,j,k) 8

Clypeus yellow (figs. 178,g–i) 9

8. Face blackish, yellowish next the eye (fig. 178,j); mandible subapically rather strongly incurved . . . . **8. recurvus,** new species

Face almost entirely yellow (fig. 178,k); mandible subapically without an unusually strong curvature. . . . . **9. labiosus,** new species

9. Yellow on side of frons extending dorsally to a little above center of eye emargination (fig. 178,g); face about 0.9 to 1.1 as high (measured from center of clypeal fovea to lower edge of antennal socket) as the mouth is wide (measured between bases of mandibles); front wing 3.0 to 3.8 mm. long.
6. constrictus Davis
   Yellow on side of frons absent, or not extending dorsally beyond center of eye emargination (figs. 178,h,i); face about 0.75 to 1.0 as high as the mouth is wide; front wing 2.9 to 5.4 mm. long . . . . . **7. funebris** (Gravenhorst)

1. Chorinaeus longicalcar Thomson

Front wing 4.5 to 7.0 mm. long; face about 1.0 as high as mouth is wide in male, about 0.9 as wide in female; median 0.6 of apical margin of clypeus approximately straight; mandible about 1.90 as long as wide in male, about 2.3 as long as wide in female, its upper tooth enlarged (especially in female) and outer face coarsely punctate; flagellum with about 39 segments in male, with about 32 segments in female; punctures on mesopleurum fine, weak, and rather dense; amount of hair on metapleurum varies according to the subspecies; front spur of middle tibia about 0.77 as long as hind spur; second segment of middle tarsus about 2.1 as long as wide in male, about 1.5 as long as wide in female; second tergite without a longitudinal carina just mesad of its spiracle; punctures of second tergite smaller and more evenly dense than in other Nearctic species, not forming well marked longitudinal rugulosities; apex of penis without setae and more bulbous than in other Nearctic species.

Coloration variable, according to the subspecies (which see).

This is the largest Nearctic species of *Chorinaeus*, and the one with the most slender build and finest sculpture. The extensive punctation of the pronotum, propodeal spiracle usually near the lateral carina, and narrow angle between the lateral carinae of the first tergite, as these characters are described in the key, are unique among the Nearctic species.

This is a Holarctic species, with five subspecies as defined below. It is the earliest species of the season, adults appearing in early spring and disappearing in early summer.

Key to the subspecies of Chorinaeus longicalcar

1. Hind femur fulvous and/or yellow, rarely its front and back blackish 2
   Hind femur black, more or less yellow at the base and apex 3
2. Hind tibia of male fulvous, with a dorsal yellowish tinge on its basal 0.2± ; yellow orbital line of female very narrow; range: Europe.
1a. longicalcar longicalcar Thomson
   Hind tibia of male fulvous to yellow, always with its basal 0.25 yellow, and usually fulvous with its basal 0.3 and a dorsal stripe yellow; yellow orbital line of female rather wide (figs. 178,a,b); range: Mostly Alleghenian fauna.
1b. longicalcar pleturus Davis

3. Hind tibia entirely yellow; range: Washington and Oregon.
1d. longicalcar flavicrus, new subspecies
Hind tibia yellow with the apex more or less infuscate 4
4. Apical infuscation of hind tibia forming a complete ring; range: Quebec and Ontario . . . . **1c. longicalcar talaris,** new subspecies
Apical infuscation of hind tibia broad below but absent above; range: Berkeley, Calif. . . . . **1e. longicalcar suralis,** new subspecies

1a. Chorinaeus longicalcar longicalcar Thomson

Chorinaeus longicalcar Thomson, 1887, Deutsche Ent. Zeitschr., vol. 31, p. 201; ♀. Type: ♀, Schwerin, Germany (? Lund).

Metapleurum with hairs near its coxal socket and in a broad band along the pleural carina extending from apex to somewhat forward of propodeal spiracle.

Male: Black. Face, lower lateral part of frons, cheek, clypeus, mouth parts, scape and pedicel in front, tegula, most of front and middle coxae, front and middle trochanters, much of hind trochanters, front side of front and middle femora, base and more or less of top and other parts of front and middle tibiae, and front and middle tarsi, yellow or yellowish; basal 0.2± of hind tibia yellowish above; front and middle coxae mostly blackish behind and basally; hind coxa black with the apex yellowish; flagellum brownish beneath.

Female: Black. Interantennal process and inner orbit from level of clypeal fovea to lower corner of frons yellowish, the orbital mark dilated at its upper end but elsewhere quite narrow; mandible ferruginous, blackish basally; palpi yellowish brown; flagellum dark brown; tegula brownish ferruginous; legs beyond coxae fulvous; front and middle coxae ferruginous, black basally; hind coxa black, ferruginous at apex.

This a European subspecies. The description above is based on two males and a female from Belgium and a female from Holstein.

1b. Chorinaeus longicalcar pleturus Davis

FIGURES 178,a,b

Chorinaeus pleturus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 211; ♀. Type: ♀, Agricultural College, Mich. (East Lansing).

Metapleurum with hairs near its coxal socket and in a broad band along pleural carina, extending from apex to somewhat forward of propodeal spiracle.

Male: Black. Face, lower lateral part of frons, front part of cheek, clypeus, mouth parts, scape and pedicel in front, and tegula, yellow; front and middle coxae yellow, basally more or less fulvous or blackish; hind coxa black, yellowish at apex, a little more extensively yellowish below; trochanters yellow; front and middle legs beyond trochanters

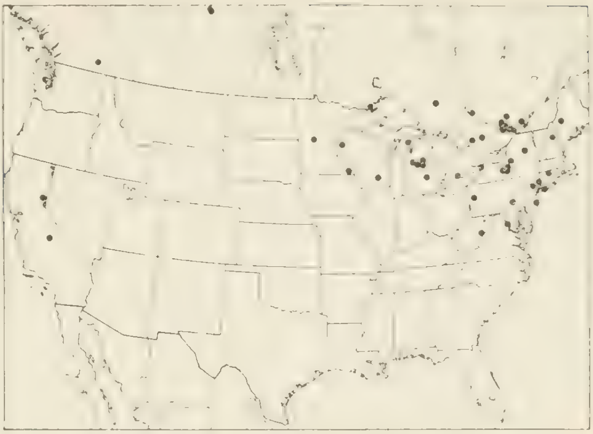


FIGURE 2.—Localities for *Chorinaeus longicalcar pleturus.*

yellow, their femora and tibiae, especially the femora behind, more or less fulvous; hind femur fulvous with the base and apex yellow, sometimes more extensively yellow and rarely entirely yellow or yellow with the front and back sides largely blackish; hind tibia fulvous, with its basal 0.3 and usually much of the upper side yellow, or rarely the entire tibia yellow; hind tarsus yellowish.

Female: Black. Interantennal process and inner orbit from level of clypeal fovea to lower corner of frons, yellow, the orbital mark rather broad and dilated at its upper end; clypeus with its apical margin usually brownish; clypeus sometimes (especially in early summer specimens) entirely or largely yellow; mandible ferruginous, with the apex darker and base blackish, or particularly in specimens with yellow clypeus, the mandible largely yellow; palpi yellow or yellowish; under side of antenna light brown, the rest darker; scape often yellow beneath; tegula yellow to fulvous; legs beyond coxae ferruginous; front and middle coxae ferruginous, blackish basally; hind coxa black, ferruginous at apex.

Specimens (59♂, 37♀): From British Columbia (Kettle Forest); California (Gold Lake in Sierra Co. and Sequoia National Park at 7,500 to 9,700 ft.); Connecticut (Windsor); Maine (Flagstaff); Michigan (East Lansing, Clare Co., Gladwin Co., Gull Island in Charlevoix Co., Midland Co., and Osceola Co.); Minnesota (Alexandria and Houston Co.); New Hampshire ("Mastyard" and Mount Madison); New Jersey (Greenwood Lake and Lahaway in Ocean Co.); New York (Southern Adirondack Mts., Bear Mt., Connecticut Hill in Tompkins Co. at 2,000 ft., Farmingdale, Ithaca, McLean Reserve in Tompkins Co., Niagara Falls, Syracuse, and Taughannock Falls); North Carolina; Ontario (Algonquin Park, Biscotasing, Constance Bay, Merivale, Muskoka District, Ottawa, Thunder Bay Beach, and Wallacetown); Pennsylvania (Harrisburg and Slippery Rock Creek); Quebec (Aylmer, Chelsea, Kazubazua, Lachute, Laniel, and Old

Chelsea); Saskatchewan (Prince Albert National Park and Waskesiu); Virginia (Falls Church); Washington (Lake Cushman in Mason Co.); West Virginia (Cheat Mt.); and Wisconsin (Madison and Polk Co.).

Collecting dates are from early spring to early summer, with the males appearing and disappearing about ten days before the females. Some of the early and late dates for males are April 16 at Mastyard, N. H.; April 18 in Midland Co., Mich.; April 19 at Falls Church, Va.; April 22 at Ottawa, Ont.; April 24 at Chelsea, Que., and at Syracuse, N. Y.; April 25 at Niagara Falls, N. Y.; June 6 at Ithaca, N. Y.; June 7 at Kazubazua, Que.; June 8 at Waskesiu, Sask.; June 10 at Constance Bay, Ont.; and June 13 at Taughannock Falls, N. Y. and at Thunder Bay Beach, Ont.

Some early and late dates for females are: April 29 at Farmingdale, N. Y.; May 4 in Midland Co., Mich.; May 8 at Merivale, Ont.; May 14 at Old Chelsea, Que.; May 22 at Laniel, Que.; June 20 at Gull Lake in Charlevoix Co., Mich.; June 23 at Alexandria, Minn., and at Mount Madison, N. H.; July 4 at Laniel, Que.; July 23 at Gold Lake in Sierra Co., Calif.; and July 25 at 7,500 to 9,700 ft. in Sequoia National Park, Calif.

We have several times collected males very early in spring (late April and early May) in central New York State, flying less than 5 centimeters above the dead leaves of mixed forests on sunny afternoons. In this area, they are among the very first ichneumonids to appear in spring.

As hosts, the subspecies has been reared from *Choristoneura fumiferana* at Algonquin Park, Ont., by Bradley; from a geometrid at Kettle Forest, B. C.; and again from a geometrid without locality data. Males were collected "feeding at sap" and "at maple sap" at Old Chelsea, Que., by G. S. Walley on Apr. 26, 1935, and Apr. 30, 1937, and at Mastyard, N. H., on Apr. 16, 1896, by W. F. Fisk. One female specimen is labeled "beaten from fir" and another female is labeled "Norway spruce." According to these data, the subspecies seems to parasitize small Lepidoptera attacking conifers.

This subspecies is characteristic of the Alleghenian fauna, but occurs also westward to British Columbia, Washington, and California.

1c. Chorinaeus longicalcar talaris, new subspecies

Metapleurum with hairs near its coxal socket and in a broad band along pleural carina, extending from apex to a little forward of propodeal spiracle.

Male: Black. Face, lower lateral part of frons, front part of cheek, clypeus, mouth parts, scape and pedicel in front, tegula, front and middle legs, and hind leg beyond femur, yellow; front and middle femora usually with fulvous or brownish areas behind; hind tibia brown or blackish on the apical 0.1 to 0.25; apex of hind coxa (a little more broadly beneath), hind trochanters, and base and apex of hind femur, yellow; flagellum brown beneath.

Female: Black. Interantennal process and inner orbit from level of clypeal fovea to lower corner of frons, yellow, the orbital mark rather broad and a little widened near antenna; apical margin of clypeus brownish; disc of clypeus often yellowish brown; scape yellow beneath; mandible ferruginous medially; maxilla, labium, tegula, extreme apices of coxae, apices of trochanters, hind second trochanter, bases and apices of femora, and tibia, yellow, the apical 0.1 to 0.3 of hind tibia blackish; tarsi yellow, grading to yellowish brown toward the apex; flagellum brown, darker above.

Type: ♀, Mattawa, Ont., incubator reared from lepidopterous pupa, Feb. 21, 1939 (Ottawa).

Paratypes: ♂, in sap bucket, Chelsea, Que., Apr. 21, 1933, G. S. Walley (Ottawa); and 14♂, 11♀ incubator-reared from various lepidopterous pupae by the Canadian forest insect survey during the years 1937 to 1945. The localities represented are: Ontario (Achray, Algonquin Park, Deux Rivières, Chalk River, Kapuskasing, Lake Two Rivers, Nicholson, Petawawa, Timagami, and Wensley); and Quebec (Bois Franc, Breckenridge, Chelsea, John Bull Depot, Maniwaki, and Mont St. Michel).

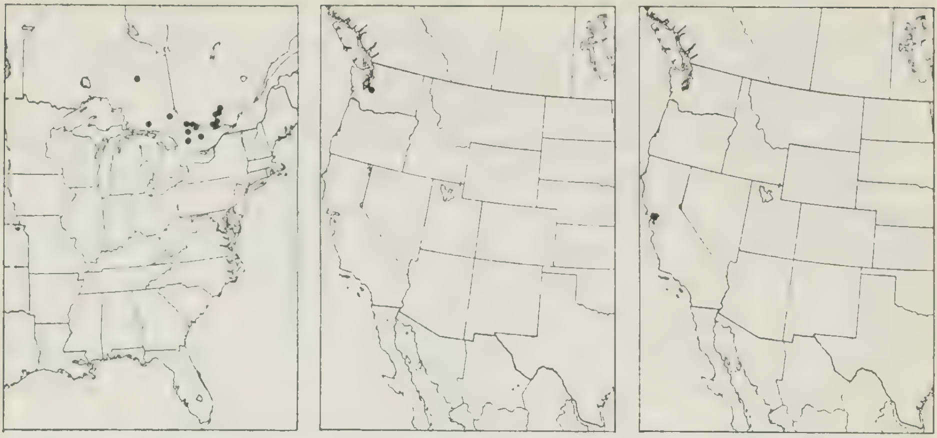
The hosts recorded for these are: *Choristoneura fumiferana* (one locality); *Caripeta divisata* (one locality); *Caripeta angustiorata*? (one locality); *Semiothisa granitata* (one locality); *Protoboarmia porcelaria* (three localities); *Paraphia piniata* (three localities); Geometridae (three localities); Noctuidae (four localities), and Lepidoptera (one locality).

This subspecies occurs in the Canadian zone of Ontario and Quebec, where it parasitizes a variety of small Lepidoptera on conifers. All specimens but one are from rearings.

1d. Chorinaeus longicalcar flavicrus, new subspecies

Metapleurum with hairs over its entire surface.

Male: Black. Face, lower lateral part of frons, clypeus, mouth parts, scape and pedicel in front, tegula, front and middle legs, and hind leg beyond femur, yellow; front and middle coxae blackish basally; front and middle femora with a large black area behind; apex of hind coxa yellow (more extensively below); hind trochanters yellow except for a large brown area on upper side of first trochanter; hind femur yellow at base and apex.



FIGURES 3–5.—Localities, subspecies of *Chorinaeus longicalcar:* 3 (left), *talaris;* 4 (center), *flavicrus*; 5 (right), *suralis*.

Female: Black. Interantennal process and broad inner orbit from level of clypeal fovea to lower corner of frons, yellow; apical half of mandible ferruginous; scape beneath, palpi, spot on tegula, and legs beyond femora, yellow; apices of coxae, apices of first trochanters, all of second trochanter of hind legs, and bases and apices of femora, yellow.

Type: ♀, "Boyer, Oreg.," Apr. 22, 1925 (Washington, USNM 63591).

Paratype: ♂, Puyallup, Wash., Mar. 11, 1935, Wm. W. Baker (Washington).

1e. Chorinaeus longicalcar suralis, new subspecies

Metapleurum bare near the middle, the rest with hairs.

Male: Colored like male of *C. longicalcar flavicrus* except that front part of cheek is yellow and hind tibia has a subapical ventral brown patch occupying 0.3 of its length.

Female: Black. Interantennal process, broad inner orbit from level of clypeal fovea to lower corner of frons, spot on scape beneath, palpi, and spot on tegula, yellow; apex of coxae, apex of trochanters, and apex and extreme base of femora, yellow; legs beyond femora yellow with a brownish tinge, especially toward apex of tarsi; front and middle tibiae with an obscure brown stripe beneath; hind tibia with a large blackish subapical area beneath that extends for about 0.35 its length and upwards on its sides.

Type: ♀, Berkeley, Calif., Apr. 26, 1938, R. M. and G. E. Bohart (Washington, USNM 63592).

Paratypes: 2♀, same data as type (Townes). ♂, Berkeley, Calif., Apr. 17, 1935 (Townes).

2. Chorinaeus aequalis, new species

FIGURE 178,c

Front wing 3.7 to 5.0 mm. long; face about 0.85 as high as the mouth is wide; median 0.6 of clypeal margin straight; mandible about 1.85 as long as wide in male, about 2.1 as long as wide in female, its upper tooth enlarged (especially in female) and outer face with rather coarse punctures; flagellum with about 32 segments in male and about 29 segments in female; metapleurum with rather sparse hairs on its upper third; front spur of middle tibia almost exactly as long as the hind spur; second segment of middle tarsus about 1.3 as long as wide in male, about 1.25 as long as wide in female; second tergite with a distinct longitudinal carina just mesad of its spiracle, in its basal half; sculpture of second tergite as sharp, irregular, longitudinal wrinkling mixed with rather dense, coarse punctures; apex of penis with 7 to 15 setae on each side.

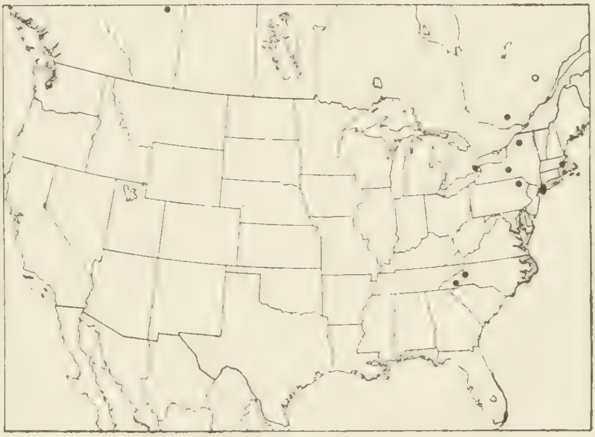


FIGURE 6.—Localities for *Chorinaeus aequalis.*

Colored like *Chorinaeus excessorius* except that under side of scape and pedicel have little or no yellow, mandible of female is brown, and clypeal fovea of female is often narrowly surrounded with brown.

Type: ♀, Farmingdale, N. Y., July 15, 1938, H. and M. Townes (Washington, USNM 63593).

Paratypes: 3♀, same data as type (Townes). ♂, Edmonton, Alta., July 13, 1947, E. H. Strickland (Townes). ♀, Holliston, Mass., Sept. 17, N. Banks (Cambridge). ♂, Babylon, N. Y., July 9, 1936, Blanton and Borders (Townes). ♂, Connecticut Hill at 2,095 ft., Tompkins Co., N. Y., June 1936, H. Townes (Townes). ♀, Cranberry Lake, N. Y., July 5, 1917, C. J. Drake (New York). 2♀, Farmingdale, N. Y., July 10 and 17, 1938, H. and M. Townes (Townes). ♀, Crabtree Meadows at 3,600 ft. in Yancey Co., N. C., Aug. 25, 1950, H., M., D., and J. Townes (Townes). ♀, Mount Pisgah N. C., June 21, 1940, H. and M. Townes (Townes). ♀, Jordon, Ont., Aug. 6, 1925, C. H. Curran (Ottawa). ♂, Spring Brook, Pa., Aug. 25, 1945, H. Townes (Townes). ♂, Westmoreland County, Pa., July (Pittsburgh). ♀, Wright, Que., July 6, 1933, G. S. Walley (Townes). ♀, Glencarlyn, Va., July 14, N. Banks (Cambridge).

This species occurs in the Alleghenian fauna. Adults have been collected from late June to late August.

3. Chorinaeus excessorius Davis

FIGURES 163,a; 178,d

Chorinaeus excessorius Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 209; ♀. Type: ♀, Washington (Philadelpia).

Front wing 3.5 to 5.4 mm. long; face about 1.1 as high as the mouth is wide in male, about 0.94 as high in female; median 0.6 of clypeal margin weakly concave; mandible about 1.95 as long as wide in male, about 2.0 as long as wide in female, its upper tooth only a little larger than its lower tooth, its outer face with rather coarse punctures; flagellum with about 34 segments in male, with about 29 segments in female; metapleurum with scattered hairs on its upper third; front spur of middle tibia about 0.75 as long as the hind spur; second segment of middle tarsus about 2.5 as long as wide in male, about 2.25 as long as wide in female; second tergite with an indistinct longitudinal carina just mesad of its spiracle, occupying its basal half; sculpture of second tergite as coarse subadjacent punctures with a tendency to longitudinal wrinkling between the punctures; apex of penis with 4 to 6 stout setae on each side.

Black. Face, frons laterally to top of eye emargination, cheek, temple next to cheek, clypeus, mouth parts, under side of scape and pedicel, tegula, front and middle coxae and trochanters, apex of femora and basal 0.2 of tibiae, pale yellow; front and middle coxae more or less tinged with fulvous, especially in female; apex of hind femur and

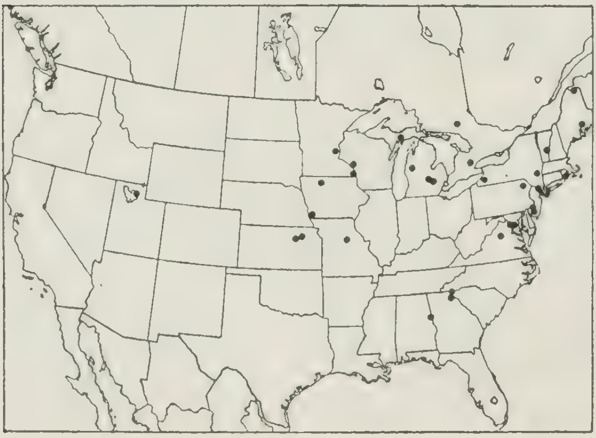


FIGURE 7.—Localities for *Chorinaeus excessorius.*

hind tibia beyond basal 0.2 slightly infuscate; legs fulvous except as described otherwise, the front legs of male beyond the trochanters more or less yellowish; clypeal fovea brownish; flagellum light brown below, dark brown above.

This species is close to the European *Chorinaeus cristator* (Gravenhorst), 1829, differing from *cristator* in having the mandible a little narrower, the hind coxa ferruginous rather than black, and an average of more numerous and more slender setae on the apex of the penis.

Specimens (31♂, 42♀): From Alabama (Langdale); California ("Mt. St. Helena"); Georgia (Rabun Bald in Rabun Co. and Yonah Mt. in Hall Co.); Iowa (Fremont Co. and Kossuth Co.); Kansas (Manhattan and Wamego); Maine (Bangor and Fort Kent); Maryland (Takoma Park); Michigan (Delta Co., East Lansing, Newaygo Co., and George Reserve in Livingston Co.); Minnesota (Chisago Co., Fillmore Co., and Houston Co.); Missouri (Columbia); New Jersey (Chesilhurst, Moorestown, and Ramsey); New York (Bemus Point, Eastport, Farmingdale, Greene Co., and Huntington); Ontario (Erin and Sudbury); Pennsylvania (Spring Brook); Rhode Island (Kingston); Utah (Ogden); Vermont (Woodstock); Virginia ("Barcroft," Dunn Loring, and Mount Elliot in Augusta Co. at 4,473 ft.); Washington; and Wisconson (Trempealeau Co.).

The collection dates are rather evenly distributed in June, July, and August, with a few outside of this range as follows: April 29 in Iowa; May 2 in Riley Co., Kans.; May 3 on Yonah Mt., Ga.; May 7 on Mount St. Helena, Calif.; May 16 at Ogden, Utah; May 23 in Fillmore Co. and Houston Co., Minn.; September 3 in Kossuth Co., Iowa; September 4 at Columbia, Mo.; September 6 at Dunn Loring, Va.; and October 8 at Takoma Park, Md.

Host records include a number of specimens reared from *Ancylis comptana* by R. L. Parker and S. A. Summerland at Manhattan, Kans., and at Wamego, Kans., and a female reared from *Choristoneura fumiferana* at Fort Kent, Maine.

In the authors' collecting the species has been swept on numerous occasions from the undergrowth of deciduous forests.

This species occurs in the Transition and Upper Austral zones, rather commonly east of the 100th meridian, sparingly from there to the Pacific Coast. Adults are on the wing throughout the summer.

4. Chorinaeus californicus Ashmead

FIGURE 178,e

Chorinaeus californicus Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 200; ♂. Type: ♂, Santa Cruz Mts., Calif. (Washington).

Front wing 3.8 to 4.2 mm. long; face about 0.94 as high as mouth is wide in male, about 0.85 as high in female; central 0.6 of clypeal margin straight; mandible about 2.0 as long as wide, its upper tooth somewhat larger than its lower tooth, its outer face smooth, with some large weak punctures; flagellum with about 28 segments in male, with about 23 segments in female; metapleurum with scattered hairs in its upper 0.2; front spur of middle tibia about 0.73 as long as hind spur; second segment of middle tarsus about 2.5 as long as wide in male, about 2.25 as long as wide in female; second tergite with or without a longitudinal carina just mesad of its spiracle, the tergal sculpture composed of coarse, subadjacent punctures with a tendency to longitudinal wrinkling between the punctures; apex of penis as in *Chorinaeus funebris*, without setae.

Colored like *Chorinaeus excessorius* except that hind coxa is blackish with apex ferruginous.

Specimens: 2♀, Big Delta, Alaska, June 24 and 30, 1951, W. R. M. Mason (Ottawa). ♂, Vancouver, B. C. (Washington). ♂, 2♀, San Francisco, Calif., Apr. 10, 1907, E. C. Van Dyke (San Francisco and Townes). ♀, San Francisco, Calif., May 10, 1908, E. C. Van Dyke (Townes). ♂ (type), Santa Cruz Mts., Calif. (Washington). ♀, Stinson Beach, Calif., Apr. 6, 1951, E. I. Schlinger (Townes). ♂, Easton, Wash. (Washington).

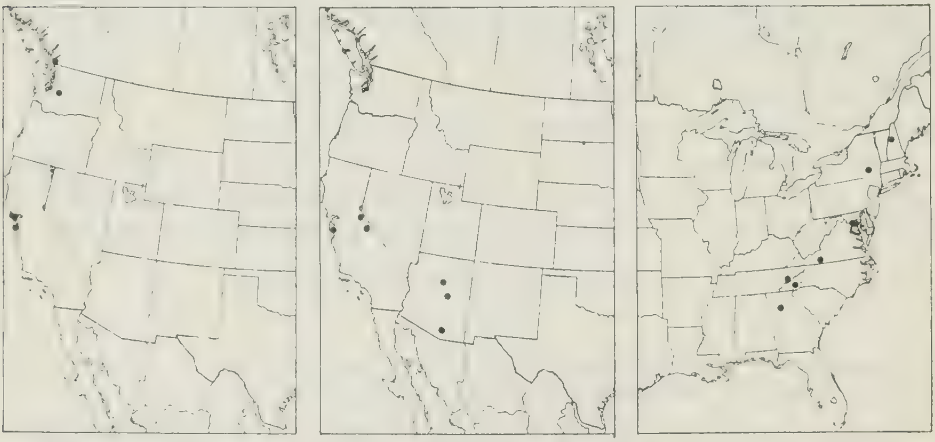
The range is from Alaska to southern California.

5. Chorinaeus opacitas Davis

FIGURE 178,f

Chorinaeus opacitas Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 210; ♀. Type: ♀, Nevada (Philadelphia).

Front wing 3.9 to 4.8 mm. long; face about 0.91 as high as mouth is wide in male, about 0.85 as high in female; central 0.6 of clypeal margin a little up-bowed; mandible about 1.85 as long as wide, its



FIGURES 8–10.—Localities: 8 (left), *Chorinaeus californicus;* 9 (center), *C. opacitas;* 10 (right), *C. constrictus.*

upper tooth very little larger than its lower tooth, its outer face with moderately coarse punctures; flagellum with about 36 segments in male, with about 30 segments in female; upper 0.2 to 0.4 of metapleurum with sparse hairs that arise from more distinct punctures than in other Nearctic species of *Chorinaeus;* front spur of middle tibia about 0.78 as long as hind spur; second segment of middle tarsus about 1.8 as long as wide in male, about 1.35 as long as wide in female; second tergite with a weak longitudinal carina just mesad of its spiracle in its basal half, this carina almost obsolete in the female; second tergite with close, moderate sized, very sharp punctures, in the males also with a trace of longitudinal wrinkling; apex of penis as in *Chorinaeus funebris,* without setae.

Male: Black. Face, lower lateral corner of frons (truncate above just below center of eye emargination), cheek, clypeus, mouth parts, spot on scape beneath, front and middle coxae except above, front and middle trochanters, front side of front and middle tibiae, and basal 0.2 of all tibiae, pale yellow; front and middle tarsi pale yellow, brownish beyond the middle; front and middle tibiae brown behind; front and middle femora ferruginous, pale yellow at apex; front and middle coxae brownish or blackish basally and above; hind coxa blackish; hind trochanters pale, the first trochanter blackish behind; hind femur ferruginous, infuscate at apex; hind tibia ferruginous, fuscuous dorsally, its basal 0.2 pale yellow and its spurs pale; hind tarsus mostly infuscate; tegula yellow, brownish apically; flagellum with reddish brown tinges below.

Female: Black. Side of face, interantennal triangle, clypeus, and mouth parts, pale yellow; apical part of mandible reddish brown; tegula ferruginous with a small basal yellow spot; flagellum brown beneath; legs ferruginous, the basal 0.2 of tibiae yellowish, hind coxa blackish except at apex, apex of hind femur and upper side of hind tibia weakly infuscate (except on basal 0.2), and hind tarsus brown.

Specimens: 2♀, Parker Creek, Sierra Ancha, Ariz., Apr. 20 and May 4, 1947, H. and M. Townes (Townes). ♂, Santa Rita Mts., Ariz., Apr. 25, 1940, P. W. Oman (Washington). ♂, Felton, in the Santa Cruz Mts. at 300 to 500 ft., Calif., May 20 to 25, 1907, J. C. Bradley (Ithaca). 9♂, 4♀, Leevining, Calif., June 21, 22, and 24, 1948, H., M., G., and D. Townes (Townes). ♂, near Sonora Pass, 8,000 ft., Calif., July 6, 1948, H., M., G., and D. Townes (Townes). ♀ (type), Nevada (Philadelphia). ♂, Oak Creek Canyon, Ariz., June 19, 1949, D. G. Denning (Townes).

This species is moderately common among semidesert shrubs of Southwestern United States. Adults occur late in spring, before development of the heat and drought of summer.

6. Chorinaeus constrictus Davis

FIGURE 178,g

Chorinaeus constrictus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 209; ♀. Type: ♀, Franconia, N. H. (Philadelphia).

Front wing 3.0 to 3.8 mm. long; face about 1.2 as high as mouth is wide in male, about 0.95 as high in female; central 0.6 of clypeal margin straight; mandible about 2.1 as long as wide, its upper tooth much larger than its lower tooth, its outer face with rather coarse punctures; flagellum with about 29 segments in male, with about 25 segments in female; metapleurum with a few hairs on its upper 0.12; front spur of middle tibia about 0.70 as long as hind spur; second segment of middle tarsus about 1.6 as long as wide in male, about 1.0 as long as wide in female; second tergite with a longitudinal carina just mesad of spiracle in its basal half, its punctures of moderate size, strong, and rather close, between the punctures with a strong tendency to longitudinal wrinkling, especially in the male; apex of penis as in *Chorinaeus funebris*, without setae.

Male: Black. Face, lower lateral part of frons (extending to, or truncate below middle of eye emargination), cheek, temple next to cheek, under side of scape and pedicel, mouth parts, tegula, and legs except as noted below, pale yellow; femora fulvous except at apex; hind coxa fulvous except at apex; hind tibia beyond its basal 0.2 fulvous, weakly infuscate dorsad; flagellum light brown below, dark brown above; apical part of tegula fulvous.

Female: Black. Face, lower lateral part of frons to near or just above center of eye emargination, cheek, temple next to cheek, under side of scape, mouth parts, front and middle coxae, all trochanters, apex of femora, basal 0.2 of tibiae, and basal half of tarsi, pale yellow; rest of legs fulvous and the fore and middle coxae tinged with fulvous; tegula yellow, the apical half ferruginous.

Specimens: ♀, Atlanta, Ga., May 27, 1941, P. W. Fattig (Washington). ♀, Bowie, Md., June 24, 1945, H. and M. Townes (Townes). ♂, Takoma Park, Md., July 1, 1943, H. and M. Townes (Townes). ♀ (type), Franconia, N. H., A. T. Slosson (Philadelphia). ♀, Oneonta, N. Y., Aug. 24, 1935, H. Townes (Townes). ♀, Mount Pisgah at 5,500 ft., N. C., June 25, 1951, H. and A. Howden (Townes). 5♂, 1♀, collected flying over large *Hypericum* bushes in meadow, Galax, Va., Aug. 29, 1955, H. and M. Townes (Townes). ♂, Gatlinburg, Tenn., Aug. 22, 1950, G. S. Walley (Ottawa).

7. Chorinaeus funebris (Gravenhorst)

Front wing 2.9 to 5.4 mm. long; face about 0.90 as high as width of mouth in male, about 0.83 as high as width of mouth in female, but these measurements unusually variable; median 0.6 of clypeal margin faintly up-bowed; mandible about 2.1 as long as wide in male, about 2.3 as long as wide in female, its upper tooth much larger than its lower tooth, its outer face with very coarse, close punctures; flagellum with about 29 segments in male, with about 27 segments in female; metapleurum with hairs on its upper 0.2 to 0.3; front spur of middle tibia about 0.71 as long as hind spur; second segment of middle tarsus about 2.2 as long as wide in male, about 1.33 as long as wide in female; second tergite with a longitudinal carina just mesad of spiracle in its basal half; second tergite with indistinct to strong longitudinal wrinkles, with interspersed strong, rather close punctures; apex of penis without setae.

This species is variable and difficult to define. The separation from the species *C. constrictus* is particularly tenuous and may not be valid. Males might easily be confused with males of *C. recurvus*. The better recognition characters for *C. funebris* are the absence or small extent of yellow on the frons, rather wide mouth and long mandible, with heavy close punctures on outer face of mandible and upper mandibular tooth much larger than lower tooth, strong longitudinal wrinkling on second tergite, and in the female a tendency to have a median subdorsal facial spot, the area of the clypeal fovea, and the mandible, brownish. We have 10 specimens (all males) which cannot be determined with certainty. They probably all belong under *C. funebris*, but some may be *C. constrictus* or represent one or more new species, thus far unrecognized.

There are four distinguishable subspecies, as treated below.

Key to the subspecies of Chorinaeus funebris

1. Hind coxa partly to entirely fulvous, at least its apical 0.2 fulvous; range: Canadian to Upper Austral zones east of the Rocky Mountains; also Alberta and British Columbia . . . . **7a. funebris carinatus** (Cresson)
   Hind coxa entirely black or blackish 2
2. Face with a median blackish wedge or lobe extending from its upper part to the clypeal suture, the yellow of the face being thus divided into lateral halves (fig. 178,i); hind femur entirely blackish; range: Colorado and Idaho. **7d. funebris divisus,** new subspecies
   Face without a median blackish area, or with a smaller blackish area that does not completely divide the yellow of the face into lateral halves (fig. 178,h); hind femur fulvous to fuscous tinged with fulvous 3
3. Hind femur fuscous tinged with fulvous; range: Europe. **7b. funebris funebris** (Gravenhorst)
   Hind femur clear fulvous, with a faint dorsoapical infuscation; range: Nevada to Arizona . . . . **7c. funebris clarus,** new subspecies

7a. Chorinaeus funebris carinatus (Cresson)

FIGURE 178,h

Tryphon carinatus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 273; ♂. Type: ♂, Illinois (Philadelphia).

Polyrhabdus cariniger Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 98; ♂, ♀ (new synonymy). Types: ♂, ♀, ?Illinois (destroyed in Chicago fire of 1871).

Front wing 2.9 to 5.4 mm. long; longitudinal wrinkling on second tergite usually strong.

Black. Face, sometimes lower lateral part of frons to as high as center of eye emargination, cheek, clypeus, mouth parts except usually for female mandible, front half of tegula, front and middle coxae and trochanters of male, apex of femora and basal 0.2 of tibiae, pale yellow or ochraceous yellow. The face usually has a median subdorsal elliptical brownish mark, often its upper lateral corner black, and especially in females the clypeal fovea is usually brownish. Female mandible pale brown. The frons is commonly entirely black and when there is yellow in its lower lateral corner this is truncate rather than tapered dorsally, and rarely reaches center of eye emargination. Antenna tinged with brown below; back half of tegula ferruginous; hind coxa entirely ferruginous or basally more or less fuscous, at least its apical 0.2± always ferruginous; legs fulvoferruginous except as described otherwise, the hind tarsus, hind tibia beyond its basal 0.2, and usually apex of hind femur above, weakly infuscate.

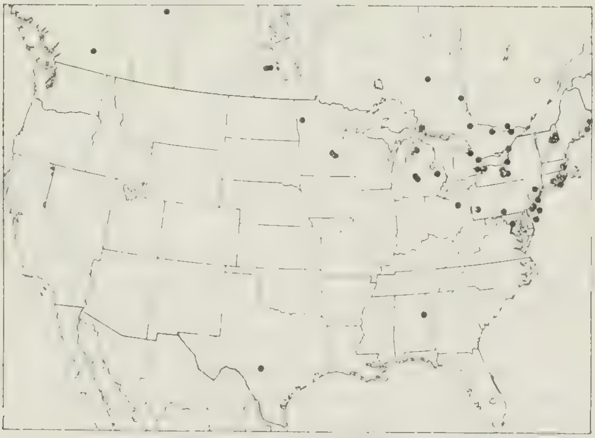


FIGURE 11.—Localities for *Chorinaeus funebris carinatus.*

In the absence of the type of *Polyrhabdus cariniger*, application of the name has been decided on the basis of the original description. This is rather detailed and indicates that very probably the present form was Walsh's *cariniger*.

Specimens (93♂, 92♀): From Alabama (Pyriton); Alberta (Edmonton); British Columbia (Trinity Valley near Lumby); Connecticut

(East River and Voluntown); Illinois; Maine (Bar Harbor and Machias); Manitoba (Deepdale and Riding Mt. Park); Maryland (Glen Echo); Massachusetts (Holliston); Michigan (Antrim Co, Belding. Ionia Co., and Tuscola Co.); Minnesota (Minneapolis, Norman Co., and St. Paul); New Hampshire (Franconia, Mount Madison, and Randolph); New Jersey (Anglesea, Bridgeboro, Greenwood Lake, Milltown, Moorestown, and Seaside Park); New York (Geneva, Grindstone Island at Clayton, Ithaca, Lockport, Montauk, Oswego, and Ringwood in Tompkins Co.); Nova Scotia (Frederickton and Ottawa House at Parrsboro); Ohio (Wayne Co.); Ontario (Angus, Golden Lake, Grimsby, North Bay, Ottawa, Opasatika, Sault Ste. Marie, Swastika, and Toronto); Pennsylvania (Fayetteville and Pittsburgh); Quebec (Wakefield); Rhode Island (Westerly); and Texas (Kerrville).

Most of the collecting dates are rather evenly distributed from June 4 through September 15. Those outside of this range are: April 13 and May 30 at Kerrville, Tex.; May 28 at Geneva, N. Y.; May 29 at Oswego, N. Y.; May 31 at Ithaca, N. Y.; May at Moorestown, N. J.; September 23 at Toronto, Ont.; and October 6 and 7 at Ottawa, Ont.

The species has been reared from *Ancylis comptana* many times and at the following localities: Moorestown, N. J.; southern N. J.; Bridgeboro, N. J.; Fayetteville, Pa.; and a probable record "reared from host on strawberry" in Wayne Co., Ohio, June 27, 1938. These rearings from *Ancylis comptana* were mostly if not all in connection with insectary rearings of *Macrocentrus ancylivorus* for biological control of *Grapholitha molesta*, in which strawberry leaves infested with *Ancylis comptana* were brought into the insectary and the emerging parasites collected. The association of *C. funebris carinatus* with *Ancylis comptana* would thus be highly probable but not proven. Other rearings recorded on pin labels of the specimens studied are from *Strepsicrates smithiana* on bayberry, Anglesea, N. J., July 13, W. D. Kearfott; ?*Trichotaphe*, Trinity Valley, Lumby, B. C., Sept. 5, 1937; lepidopteran on *Salix*, Ottawa House at Parrsboro, N. S., Sept. 11, 1914, J. McDunnough; *Tetralopha asperatella*, Swastika, Ont., 1943; *Tetralopha asperatella*, Angus, Ont., 1945; *Acrobasis betulella*, Sault Ste. Marie, Ont., 1942; *Argyrotaenia lutosana*, Opasatika, Ont., 1939; and *Anacampsis rhoifructella*, Golden Lake, Ont., 1942.

This subspecies is widely distributed in the Transition and Upper Austral zones east of the 100th meridian. It has also been found more sparingly westward to the Pacific coast. Adults are on the wing mostly from early June to mid-September. Various small Lepidoptera serve as hosts.

7b. Chorinaeus funebris funebris (Gravenhorst)

FIGURE 165,a

Exochus funebris Gravenhorst, 1829, Ichneumonologia europaea, vol. 1, p. 695; ♂. Types: ♂♂, Netley, England (? Wroclaw).

Front wing 3.8 to 4.8 mm. long; longitudinal wrinkling on second tergite moderately strong.

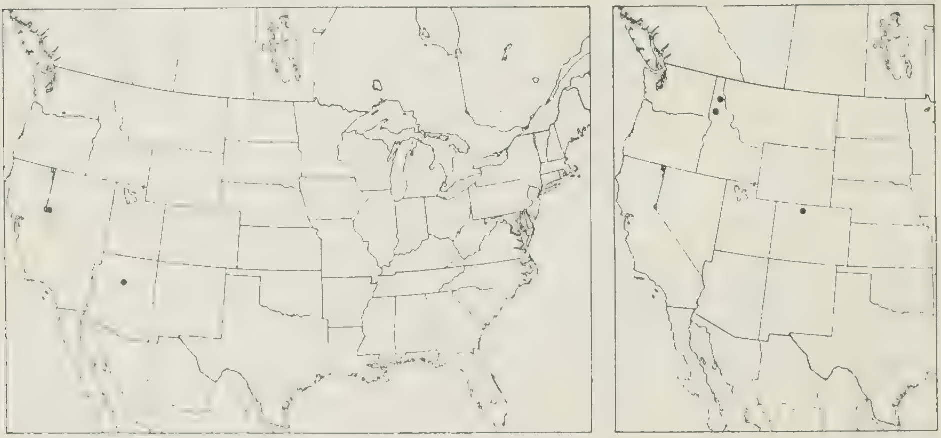
Male: Black. Face except upper lateral corner and sometimes median subdorsal brownish mark, sometimes spot on cheek, clypeus, mouth parts, front and middle coxae except for basal infuscation, front and middle trochanters, marks on hind trochanters, more or less of front sides of front and middle femora and tibiae, basal 0.2 of tibiae, and tarsi basally, pale yellow; hind coxa blackish; hind trochanters partly infuscate; hind femur and tibia (except its basal 0.2), infuscate fulvous, darkest above; first segment of hind tarsus on its apical 0.3 and all of following segments brown; legs fulvous except as described otherwise; flagellum brown beneath; tegula brown except for a basal yellow spot.

The above description is based on three males from Belgium. It may not be entirely applicable to other European material.

We have seen specimens in the Gravenhorst collection in Wroclaw, labeled *Exochus funebris*, but it seemed doubtful that any of them are original types.

7c. Chorinaeus funebris clarus, new subspecies

Front wing 4.2 to 4.5 mm. long; second tergite with very little longitudinal wrinkling and its sublateral longitudinal carina rather weak; general sculpture a little smoother and more strongly punctate than average for the species.



FIGURES 12, 13.—Localities: 12 (left), *Chorinaeus funebris clarus;* 13 (right), *C. f. divisus.*

Female: Black. Face except sometimes upper lateral corner and a median subdorsal brown spot, cheek, clypeus, mouth parts, and basal 0.2 of tibiae, light yellow; mandible often brownish; antenna tinged with brown beneath; tegula light brown, yellow basally; front and middle legs fulvous except for basal 0.2 of tibiae and basal infuscation on coxae; hind coxa entirely blackish; hind trochanters fuscofulvous; hind femur and tibia (except for its basal 0.2) fulvous, both with an apical dorsal infuscate area; hind tarsus fuscofulvous.

Type: ♀, Oak Creek Canyon, Ariz., May 19, 1947, H. and M. Townes (Washington, USNM 63594).

Paratype: ♀, Ormsby Co., Nev., July 6, C. F. Baker (Ithaca).

7d. Chorinaeus funebris divisus, new subspecies

Figure 178,i

Front wing 2.9 to 3.8 mm. long; longitudinal wrinkling on second tergite moderately strong.

Black. Large lateral areas on face (separated medially by a blackish oblong or wedge-shaped area), usually narrow margin of interantennal process, mouth parts, front leg beyond trochanters, and middle leg beyond femur, ochraceous; mandible of female usually light brown; palpi often brown; tegula brown with basal yellow spot; apex of fore and middle coxae usually yellowish brown; basal 0.2 of all tibiae pale yellowish; middle femur light brown, yellowish at apex; trochanters fuscous; hind coxa blackish; hind femur blackish brown; hind tibia except on its basal 0.2 and hind tarsus brownish fulvous.

Type: ♀, reared from *Grapholitha conversana*, Deary, Idaho, July 1, 1949, Arthur J. Walz (Washington, USNM 63595).

Paratypes: 3♂, 4♀, same data as type (Townes and Walz). 5♀, Deary, Idaho, June 13, 1949, Arthur J. Walz (Washington and Townes). ♂, reared from *Grapholitha conversana*, Deary, Idaho, January 1950 (Washington). ♂, Cataldo, Idaho, July 1, 1940, H. and M. Townes (Townes). 3♂, 1♀, Rabbit Ears Pass at 9,500 ft., Colo., Aug. 7, 1948, H., M., and G., and D. Townes (Townes).

This subspecies occurs in the Rocky Mountain area.

8. Chorinaeus recurvus, new species

Figure 178,j

Front wing 3.8 to 4.2 mm. long; face about 0.92 as high as mouth is wide in male, about 0.72 as high in female; punctures on face exceptionally fine and weak; median 0.6 of clypeal margin straight; mandible about 2.2 as long as wide, its upper tooth larger than lower tooth, its outer face with small rather weak punctures, and in the female strongly incurved; flagellum with about 26 segments in male, with about 24 segments in female; metapleurum with hairs on its upper 0.25±; front spur of middle tibia about 0.80 as long as hind spur; second segment of middle tarsus about 1.3 as long as wide; second tergite with a weak longitudinal carina just mesad of spiracle in its basal half; punctures on second tergite of medium size, strong, close, and tending to group into longitudinal rows; apex of penis as in *Chorinaeus funebris*, without setae.

Black. Male face, clypeus, cheeks, mouth parts, small spot on under side of scape and of pedicel, and front and middle coxae and trochanters, pale yellow; female face, clypeus, and mandible brown, the face with a narrow line next eye and margin of interantennal process yellowish; female palpi yellow; under side of flagellum brownish; tegula, extreme apex of femora, and basal 0.2 of tibiae, yellowish; apex of hind femur, hind tibia except on basal 0.2, and hind tarsus more or less weakly infuscate; legs fulvous except as described otherwise.

Type: ♀, Slide Mt. at 2,800 to 4,000 ft., N. Y., Aug. 25, 1935, H. and C. Townes (Washington, USNM 63596).

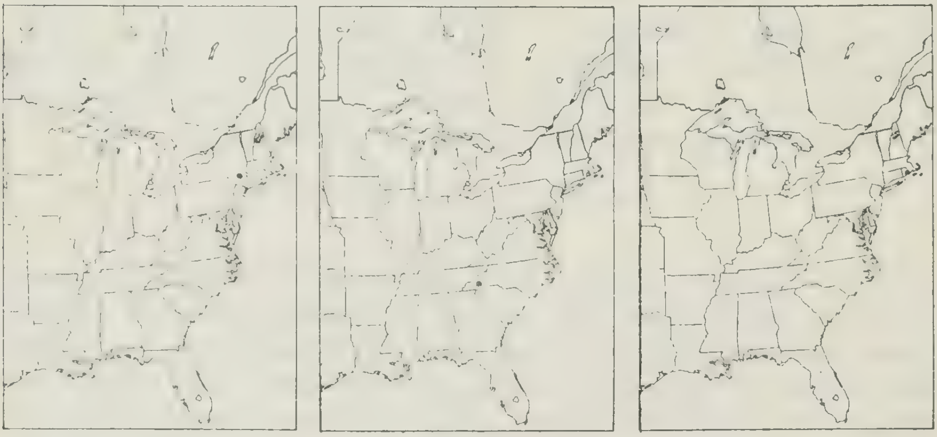
Paratypes: ♂, ♀, same data as type (Townes). ♀, Franconia, N. H., A. T. Slosson (New York). ♂, 2♀, Pinkham Notch, N. H., Aug. 24, 1951, H., M., and D. Townes (Townes).

This species has been taken only in spruce woods in the northeastern States, late in August.

9. Chorinaeus labiosus, new species

Figure 178,k

Female type: Front wing 3.2 mm. long; face 0.59 as high as mouth is wide; clypeal margin approximately straight, even to the lateral corners; mandible 2.7 as long as wide, its upper tooth much larger than lower tooth, its outer face with some rather small punctures; flagellum missing beyond the fourteenth segment; metapleurum with



Figures 14–16.—Localities: 14 (left), *Chorinaeus recurvus;* 15 (center), *C. labiosus;* 16 (right), *C. emorsus.*

a few hairs adjacent to pleural carina, these almost in a single row; front spur of middle tibia 0.85 as long as hind spur; second segment of middle tarsus 1.25 as long as wide; second tergite without a longitudinal carina just mesad of spiracle, its punctures of moderate size, strong, moderately close, and tending to be elongate.

Black. Face except for median subdorsal brown spot, lower lateral corner of frons, under side of scape, palpi, apex of front and middle coxae and of all femora, and basal 0.2 of tibiae, light yellow; clypeus dark brown, light brown on its apical margin; mandible light brown, black basally; pedicel and flagellum brown beneath; tegula brown with basal yellow spot; middle and hind basitarsi stramineous, their apical third darker; front and middle legs light brown except as described otherwise; hind coxa blackish brown, its apex stramineous; hind trochanters pale brown; hind femur, tibia, and tarsus dark brown except as described otherwise.

Type: ♀, Mount Pisgah at 4,800 to 5,300 ft., N. C., June 21, 1940, H. and M. Townes (Washington, USNM 63597).

10. Chorinaeus emorsus, new species

Figure 178.1

Female: Front wing 3.2 to 3.5 mm. long; face about 0.73 as high as mouth is wide, strongly narrowed above; median 0.6 of clypeal margin strongly up-bowed; mandible distinctive, about 2.5 as long as wide, its upper tooth exceptionally large and lower tooth small, its outer face with numerous, moderately small punctures; flagellum with about 22 segments; metapleurum with about 7 hairs posterodorsally; front spur of middle tibia about 0.89 as long as hind spur; second segment of middle tarsus about 1.7 as long as wide; second tergite without a longitudinal carina just mesad of spiracle, with fine, irregular, longitudinal wrinkling interspersed with indistinct punctures.

Black. Face yellow except for a median brown area that is expanded dorsally, its interantennal process yellow; mandible and cheek next to mandible brownish stramineous; palpi yellow; antenna brown, darker above; tegula light brown with a basal yellow area; front and middle legs stramineous, their coxae brown except at apex and the apex of their femora and base of tibiae yellowish; hind coxa blackish; hind legs beyond coxa light ferruginous brown, the extreme apex of femur and basal 0.2 of tibia yellow; femur subapically, tibia dorsally, and tarsi brown.

Type: ♀, Pinkham Notch, N. H., Aug. 23, 1951, H., M., and D. Townes (Washington, USNM 63598).

Paratypes: ♀, Mount Washington, N. H., A. T. Slosson (New York). ♀, Halifax, N. S., Sept. 5, 1950, J. McDunnough (Ottawa).

4. Genus Trieces

FIGURE 165,b

Trieces Townes, 1946, Bol. Ent. Venezolana, vol. 5, p. 60. Type: *Exochus texanus* Cresson; original designation.

Front wing 3 to 6 mm. long; front spur of middle tibia 0.25 to 0.65 as long as hind spur; thorax with an exceptionally streamlined appearance; pronotum evenly convex as the upper margin is approached, without an impression paralleling its upper margin; mesopleural suture indistinct or absent; metapleurum bare or with hairs in its upper part, with more or less distinct wrinkles near attachment of hind coxa; lateral carina of first tergite often weak or obsolescent; second tergite with a median and a sublateral longitudinal carina extending its entire length; third tergite with a median carina and sublateral carina, the sublateral carina extending 0.3 or more of the tergite's length; fourth tergite basally sometimes with median and sublateral carinae but usually ecarinate. In *Trieces teres* the carinae on the tergites are reduced. See the description of that species. In all other respects this genus is similar to *Chorinaeus*.

This is a large genus of probably worldwide distribution. The species, however, are scarce in collections. Most of them occur sparingly, among shrubby growth in rather dry habitats. When collected they have a habit of folding their wings and antennae back and pushing themselves along rather than crawling. This makes them adept at squeezing through the meshes of an insect net.

Key to the Nearctic species of Trieces

1. Median and sublateral longitudinal carinae of third tergite reaching its apex and continued on to the fourth tergite. DENTATUS GROUP 2

   Median and sublateral longitudinal carinae of third tergite present on its basal 0.8 or less (or in *T. teres*, hardly indicated at all), completely absent from fourth tergite except in some males of *T. costatus* 3

2. Lateral carina of scutellum not projecting beyond apex of scutellum; prepectal carina complete, dorsally reaching front edge of mesopleurum; metapleurum without hairs (fig. 182,b); hind femur blackish. **18. calvatus,** new species

   Lateral carina of scutellum projecting beyond apex of scutellum to form an acute tooth; prepectal carina incomplete above, not reaching front edge of mesopleurum; metapleurum with numerous hairs along its upper margin (fig. 182,c); hind femur fulvous . . . . **19. dentatus,** new species

3. Metapleurum with a vertical, slotlike pit in its hind end, broadly hairy along its entire upper margin (fig. 182,d); face 1.5 to 2.1 as wide as high. ONITIS GROUP 4

   Metapleurum without a pit in its hind end, not broadly hairy along its entire upper margin, if with hairs along its upper margin they are in a band that is either narrow or incomplete (figs. 180,a to 182,a); face 1.0 to 1.5 as wide as high 6

4. Face 1.89 to 2.25 as wide as high, bulging above base of clypeus (fig. 179,c). **22. onitis** (Davis)

   Face about 1.6 as wide as high, not bulging above base of clypeus 5

5. Middle half of apical margin of clypeus truncate or weakly convex; second segment of middle tarsus about 2.05 as long as wide in male, about 1.85 as long as wide in female . . . . **20. arcuatus,** new species

   Middle half of apical margin of clypeus faintly (most males) to distinctly (females) concave; second segment of middle tarsus about 1.5 as long as wide in male, about 1.4 as long as wide in female. Males are not always distinguishable from those of *T. arcuatus* . . . . **21. diffidens,** new species

6. Metapleurum with a group of hairs in its upper hind part, next to the pleural carina, the hairs numbering 6 to 40 or more (figs. 180,a–h). TEXANUS GROUP. 7

   Metapleurum without a group of hairs in its upper hind part, entirely hairless except often for a small group in its upper front corner and rarely one to several hairs scattered on its disc (figs. 181,a to 182,a). INTEGER GROUP 14

7. Sublateral longitudinal carina of second tergite distinct on basal 0.25 of tergite but obsolescent beyond middle of tergite; face black, with a broad vertical yellowish mark next to eye (fig. 178,o) . . . **5. teres,** new species

   Sublateral longitudinal carina of second tergite distinct and sharp the entire length of the tergite; face not colored as above 8

8. Clypeus separated from face by a weak depression; punctures on central part of face separated by about 0.7 their diameter; second tergite about 0.78 as long as wide in male, about 0.65 as long as wide in female. **1. masoni,** new species

   Clypeus not separated from face by a depression, the clypeus and face making a continuous convex surface, or sometimes there is a flattening (but not a concavity) at the juncture of the clypeus and face; punctures on central part of face subadjacent to separated by about 0.5 their diameter; second tergite 0.74 to 0.87 as long as wide 9

9. Front wing 2.9 to 3.5 mm. long . . . . **7. sapineus,** new species

   Front wing 3.8 to 5.4 mm. long. 10

10. Hairs on metapleurum in a narrow continuous band beneath the pleural carina, that is narrowed forward to the upper front corner, but not interrupted (fig. 180,d); tegula entirely black . . . **4. tegularis,** new species

    Hairs on metapleurum in a large posterodorsal group beneath the pleural carina that does not reach the upper front corner of metapleurum, sometimes also a small separate group of hairs in the upper front corner (figs. 180,b,c,f,h); tegula pale yellow to fulvous 11

11. Face and clypeus with coarse, subadjacent punctures, without distinct interspaces . . . . **6. densus,** new species

    Face and clypeus with moderate sized punctures that are separated by 0.3 to 0.5 their diameter 12

12. Metapleurum without hairs in its upper front corner (fig. 180,h); second segment of middle tarsus about 1.8 as long as wide in male, about 0.95 as long as wide in female; mandible of female dark brown. **8. texanus** (Cresson)

    Metapleurum with a group of 12 or more hairs in its upper front corner (figs. 180,b,c); second segment of middle tarsus about 2.0 or 2.2 as long as wide in male, about 1.7 or 1.8 as long as wide in female; mandible of female yellow or fulvous 13

13. Sublateral longitudinal carina of third tergite strong, extending 0.5 to 0.8 the length of the tergite; front spur of middle tibia about 0.50 as long as hind spur; hind coxa mostly or entirely black, rarely entirely fulvous. **2. costatus** (Davis)

Sublateral longitudinal carina of third tergite weak, extending only about 0.25 the length of the tergite; front spur of middle tibia about 0.58 as long as hind spur; hind coxa fulvous . . . . **3. flavifrons** (Ashmead)

14. Hind tibia uniformly fulvous or ferruginous, not at all paler at base; face and clypeus of female fulvous, in profile strongly convex below 15

Hind tibia pale yellowish on its basal 0.2±, the rest darker 16

15. Flagellum of male with 29 to 33 segments, of female with 24 to 26 segments; median segments of female flagellum about 1.0 as long as wide; hind tarsus of male ferruginous or fuscoferruginous . . . **11. integer,** new species

Flagellum of male with 26 to 27 segments, of female with 19 to 21 segments; median segments of female flagellum about 0.85 as long as wide; hind tarsus of male stramineous . . . . **12. fusus,** new species

16. Face and clypeus black, the face with a yellow margin on its interantennal projection (fig. 179,d) . . . . **13. aquilus,** new species

Face and clypeus mostly or entirely yellow or fulvous 17

17. Front wing 4.2 to 5.2 mm. long. 18

Front wing 2.6 to 4.0 mm. long. 19

18. Wrinkling of metapleurum covering about 70 percent of its area (fig. 181,a); yellow of lower lateral corner of frons reaching just to center of eye emargination; eye of male with short, sparse hairs . . . **9. ejectus,** new species

Wrinkling of metapleurum covering about 30 percent of its area (fig. 181,b), yellow of lower lateral corner of frons reaching above center of eye emargination; eye of male apparently bare . . . . . **10. walleyi,** new species

19. Hind coxa fulvous, somewhat darker basally 20

Hind coxa black or blackish, often somewhat ferruginous apically 21

20. Lower lateral corner of frons of both sexes with a conspicuous yellow (male) or fulvous (female) area that reaches dorsad beyond center of eye emargination; front wing 3.1 to 3.3 mm. long . . . . **15. marlatti** (Ashmead)

Lower lateral corner of frons of female (male unknown) with a faint ferruginous area that does not reach center of eye emargination; front wing 2.6 to 2.8 mm. long . . . . **16. bradleyi,** new species

21. Wrinkles of metapleurum extending forward of its middle (fig. 181,f); eye inconspicuously hairy, or bare; lower lateral corner of frons yellow. **14. sparsus,** new species

Wrinkles of metapleurum restricted to its hind 0.4 (fig. 182,a); eye densely and conspicuously hairy; lower lateral corner of frons blackish. **17. ciliosus,** new species

I. TEXANUS GROUP

Head of moderate width; body of moderate proportions; eye with very short sparse hairs or bare; mesopleurum often with fine longitudinal or oblique wrinkles near middle coxa; metapleurum without a vertical slot in its hind end, bare of hairs except for a few in its extreme upper front corner and a group of hairs of variable number in its upper posterior part, in the hairy area with small punctures, elsewhere polished and with wrinkling of variable extent, the wrinkling strongest next to hind coxa (figs. 180,a–h); median and sublateral carinae of third tergite present basally (indistinct in the species *T. teres*) but absent beyond its middle (except in *T. costatus*, in which these carinae are somewhat longer); fourth tergite without median or sublateral longitudinal carinae except in some males of *T. costatus*.

This group contains eight known Nearctic species, an undescribed species in the Philippines, and another in Japan. Presumably some of the described European species of the genus belong here also.

1. Trieces masoni, new species

FIGURE 180,a

Front wing 3.5 to 4.4 mm. long; face about 1.5 as wide as high, with small punctures that are separated by about 0.7 their diameter; face and clypeus in profile weakly convex, with a distinct depression setting off the clypeus; attachment of front tentorial arm outlined as a brownish oval around clypeal fovea and a tail extending dorsomesad; eye apparently bare; flagellum of male with 29 segments, of female with about 26 segments; metapleurum with coarse wrinkles in its lower half that extend forward for about 0.8 its length, in its upper half with finer irregular wrinkles interspersed with weak punctures, this wrinkled area extending forward about 0.6 the length of metapleurum; hairs on metapleurum numerous, arranged in a broad subrectangular area in its upper hind part and in a small somewhat crescentic group in its upper front corner; propodeal spiracle short elliptical, distinctly separated from pleural carina; front spur of middle tibia about 0.60 as long as hind spur; second segment of middle tarsus 2.3 as long as wide in male, about 1.6 as long as wide in female; second abdominal tergite about 0.78 as long as wide in male, about 0.65 as long as wide in female, with rather close, subconfluent, oblique punctures; sublateral longitudinal carina on third tergite rather narrow, extending about 0.3 the length of the tergite.

Black. Face except for a median dorsal area or a large median area that is mostly subdorsal or widest dorsally, yellowish white, the interantennal process always broadly bordered with yellowish white; cheek in its front part or entirely, clypeus, and mouth parts, yellowish white; tegula blackish brown, somewhat paler basally; first trochanters apically, second trochanters entirely, and bases of femora brown; tibial spurs pale brown; front leg beyond trochanters light brown, the femur more or less infuscate basally; extreme apices of middle and hind femora stramineous; middle tibia and tarsus light brown, the basal 0.15 of the tibia faintly yellowish; hind tibia light brown basally, blackish brown apically, the basal 0.15 faintly tinged with yellowish; hind tarsus fuscous.

Type: ♀, Big Delta, Alaska, June 24, 1951, W. R. M. Mason (Ottawa).

Paratypes: ♂, 2♀, same data as type (Ottawa).

2. Trieces costatus (Davis)

FIGURES 178,m; 180,b

Chorinaeus costatus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 211; ♂, ♀. Lectotype: ♀, New Hampshire (Philadelphia).
Chorinaeus pusillus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 211; ♂, ♀ (new synonymy). Lectotype: ♀, Washington (Philadelphia).

Front wing 4.0 to 4.9 mm. long; face about 1.3 as wide as high, with moderate sized punctures that are separated by about 0.5 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm making a long line dorsomesad from clypeal fovea; eye of male without hairs, of female with very short sparse hairs; mandible of female very slender, with few or no punctures distad of its basal 0.5, its upper tooth rather elongate and its lower tooth very small (in other species of the genus, the mandible is stouter, punctate to beyond its basal 0.5, and with the two teeth more nearly equal); flagellum of male with about 36 segments, of female with about 32 segments; metapleurum with a broad band of hairs dorsally, which is interrupted near its front end so that there is a small separate patch of about 12 hairs in front upper corner of metapleurum; wrinkles of metapleurum moderately coarse, extending forward nearly to middle of metapleurum; propodeal spiracle elliptic, barely separated from pleural carina; front spur of middle tibia about 0.50 as long as hind spur; second segment of middle tarsus about 2.2 as long as wide in male, about 1.8 as long as wide in female; second abdominal tergite about 0.85 as long as wide in male, about 0.80 as long as wide in female, its punctures of moderate size, close, a little elongate; sublateral longitudinal carina on third tergite extending 0.5 to 0.8 its length, in some males present also on basal part of fourth tergite.

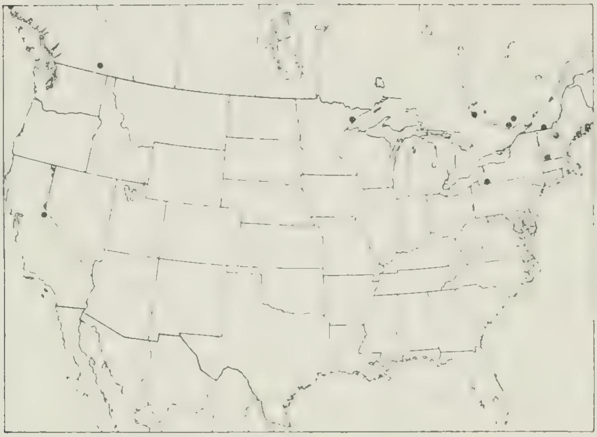


FIGURE 17.—Localities for *Trieces costatus*.

Black. Face, often lower lateral corner of frons, clypeus, cheek, mouth parts, base of tegula, apex of femora, and basal 0.2 of tibiae, pale yellow; front and middle trochanters and apex of front and middle coxae usually yellowish; face often with median dorsal spot and crescent next each antennal socket, brown; antenna brown, paler below, the scape and pedicel sometimes yellowish beneath; tegula fulvous, yellow at base; hind coxa black except sometimes at apex; hind femur often brown to black; hind tarsus and often hind first trochanter infuscate; front and middle coxae usually more or less infuscate basally; front and middle femora and trochanters often more or less brownish; legs fulvous except as described otherwise. Rarely the hind coxa is entirely fulvous.

Specimens (13♂, 10♀): From British Columbia (Robson); California (near Sonora Pass at 8,000 ft.); Colorado; Maine (Lincoln Co., Echo Lake and Great Pond on Mount Desert Isl.); Minnesota (Lake Co.); New Brunswick (Tabusintac); New Hampshire (Randolph); New York (Rock City in Cattaraugus Co.); Quebec (Kazubazua, Knowlton, Laniel, and Wakefield); Vermont (Laurel Lake near Jacksonville); and Washington. Collection dates are from June 26 to August 21, except that a male from Robson, B. C., and a male without locality were taken on May 24.

This species appears to be restricted to the Canadian zone.

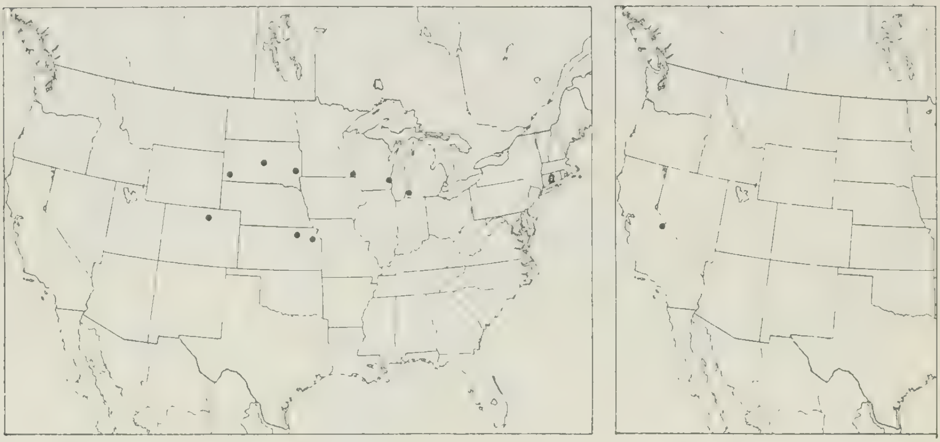
3. Triecces flavifrons (Ashmead)

FIGURES 178,n; 180,c

Chorinaeus flavifrons Ashmead, 1890, Proc. U. S. Nat. Mus., vol. 12, p. 444; ♀. Type: ♀, Wisconsin (Washington).

Front wing 4.3 to 5.1 mm. long; face about 1.3 as wide as high, with rather small punctures that are separated by about 0.5 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm making a long line dorsomesad from clypeal fovea; eye of male without hairs, of female with very short sparse hairs; flagellum with about 34 segments; metapleurum with a large area of numerous hairs in its upper posterior part, occupying about a third of its area, reaching ventrally to the submetapleural carina, and tapered out anterodorsally; anterodorsal corner of metapleurum with a group of about fourteen hairs; striae of metapleurum fine, rather weak, confined to the hind half of metapleurum; propodeal spiracle elongate, briefly separated from pleural carina; front spur of middle tibia about 0.58 as long as hind spur; second segment of middle tarsus about 2.2 as long as wide in male, about 1.7 as long as wide in female; second abdominal tergite about 0.82 as long as wide in male, about 0.78 as long as wide in female, its punctures rather strong, coarse, and close, with a slight tendency to form longitudinal rows; sublateral longitudinal carina on third tergite weak, extending about 0.3 the length of the tergite.

Black. Face, clypeus, front part of cheek, and mandible, pale yellow in male, ferruginous in female, the face of female more or less yellowish dorsally; face with brownish crescent next to each antennal socket; palpi, base of tegula, apex of femora, and basal 0.2 of tibiae, pale yellow; front and middle tarsi basally yellowish; upper face of front and middle tibiae of male entirely yellow; antenna dark brown, a little paler below; tegula fulvous, yellow at base; legs fulvous except as described otherwise; side of abdomen usually tinged with ferruginous, especially in females.



Figures 18, 19.—Localities: 18 (left), *Trieces flavifrons;* 19 (right), *T. tegularis.*

Specimens: ♀, Hartford, Conn., May 12, 1894 (Washington). ♂, South Meriden, Conn., July 12, 1938, Harry L. Johnson (Townes). 2♀, Fort Collins, Colo., June 15, 1896, and "June," C. F. Baker (Washington). ♀, Lawrence, Kans., June 23, 1900, H. Kahl (Pittsburg). ♀, Riley Co., Kans., July 14 (Townes). ♂, Van Auken Lake, Van Buren Co., Mich., July 16, 1939, W. H. Burt (Ann Arbor). ♂, Houston Co., Minn., May 29, 1939, Philip Marvin (St. Paul). ♀, Canning, S. Dak., July 15, 1945, H. C. Severin (Townes). ♂, Chester, S. Dak., June 17, 1930, G. I. Gilbertson (Townes). ♂, Hot Springs, S. Dak., July 14, 1924 (Washington). ♂, Milwaukee, Wis., Graenicher (Cambridge). ♀ (type), Wisconsin (Washington).

This species ranges from Connecticut to South Dakota, south to Colorado and Kansas. Judging from its color, structure, and distribution, it probably occurs in rather open dry habitats.

4. Trieces tegularis, new species

Figures 179,a; 180,d

Female type: Front wing 3.8 mm. long; face 1.5 as wide as high, its punctures of moderate size, sharp, separated by about 0.25 their diameter; face and clypeus in profile weakly convex; attachment of front tentorial arm visible as a short line extending mesad and a very short stub distovertrad from clypeal fovea; eye apparently bare; flagellum with 22 segments; metapleurum with a narrow area of hairs along its entire upper margin, broader at its hind end, narrowed in front; striae of metapleurum moderately fine, reaching forward to 0.3 the distance from its front edge; propodeal spiracle very short elliptic, distinctly separated from pleural carina; front spur of middle tibia 0.47 as long as hind spur; second segment of middle tarsus 1.45 as long as wide; second abdominal tergite 0.75 as long as wide, with moderate-sized, rather close, longitudinal punctures; sublateral carina of third tergite rather weak, extending 0.3 the length of the tergite.

Black. Face, clypeus, and mouth parts yellow, the mandible fulvous with the base brown, the face with its upper 0.2 blackish; tegula entirely blackish; extreme apex of femora, basal 0.2 of tibiae, and tibial spurs stramineous; front femur blackish brown, lighter brown apically and in front; front tibia light bown; tarsi and middle and hind tibiae dark brown, the segments usually paler apically; legs blackish except as described otherwise.

Type: ♀, taken in an area of desert shrub, Leevining, Calif., June 24, 1948, H., M., G., and D. Townes (Washington, USNM 63599).

5. Trieces teres, new species

FIGURES 178,o; 180,e

Front wing 3.5 to 4.3 mm. long; face about 1.5 as wide as high, its punctures small and sharp, separated by about 0.8 their diameter; face and clypeus in profile weakly convex; clypeal fovea subcircular, without evident marks around it from attachment of front tentorial arm; eye with very short and sparse hairs; flagellum with 26 segments in male, with about 24 segments in female; metapleurum with numerous hairs along its upper margin, the hair band very narrow anteriorly, broader posteriorly; striae of metapleurum rather fine, confined to an area near the hind coxal attachment but extending forward just above submetapleural carina; propodeal spiracle elliptic, adjacent to pleural carina; front spur of middle tibia about 0.64 as long as hind spur; second segment of middle tarsus about 2.05 as long as wide in male, about 1.85 as long as wide in female; second tergite 0.74 as long as wide in male, about 0.70 as long as wide in female, with medium sized, longitudinal, moderately close punctures; sublateral longitudinal carina of second tergite present and distinct only on basal 0.25 of the tergite, but indicated also at very base of third tergite (in other species of the genus the sublateral longitudinal carina of second tergite extends its entire length); median longitudinal carina extending almost entire length of second tergite and present on basal 0.5 of third tergite.

Black. A lateral, vertical, elliptical area on each side of face yellowish; mouth parts and apical margin of clypeus brown; tegula brown, yellow basally; apex of femora and basal 0.2 of tibiae stramineous; coxae, trochanters, and middle and hind femora (except at apex), blackish; front femur (except at apex) brown, darker basally; tibiae except on basal 0.2, and tarsi brown.

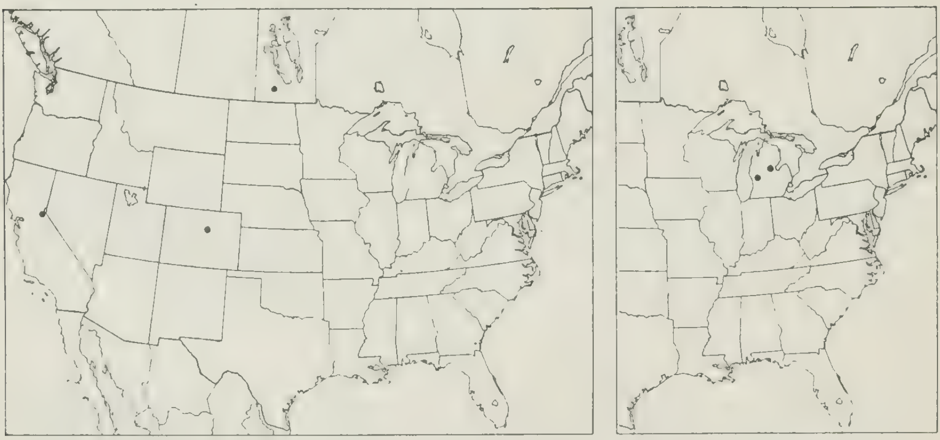
Type: ♀, Echo Lake, Eldorado Co., Calif., July 14, 1951, W. W. Middlekauff (Berkeley).

Paratypes: ♂, Golden, Colo., May 29 (Washington). ♀, Green Mt., Golden, Colo., May 24, 1919, L. O. Jackson (Townes). ♀, Aweme, Man., May 28, 1925, R. D. Bird (Ottawa).

6. Trieces densus, new species

Figure 180,f

Front wing 3.7 to 3.8 mm. long; face about 1.3 as wide as high, its punctures coarse, sharp, subadjacent; face and clypeus in profile moderately convex; attachment of front tentorial arm visible as a brownish ellipse around clypeal fovea with a linear projection mesad along the clypeal suture; eye apparently bare; flagellum with 28 segments in male, with 26 segments in female; metapleurum with a wedge-shaped group of about 15 hairs in its upper hind part and its upper front corner margined by a small crescentic group of hairs; striae of metapleurum moderately coarse, covering about 0.3 of its area near the hind coxa; propodeal spiracle elliptic, somewhat distant from pleural carina but connected to it by a raised area; front spur of middle tibia about 0.44 as long as hind spur; second segment of middle tarsus 2.0 as long as wide in male, 1.7 as long as wide in female; second abdominal tergite 0.87 as long as wide in male, 0.81 as long as wide in female, with close, rather coarse punctures; sublateral longitudinal carina of third tergite extending about 0.45 its length.



Figures 20, 21.—Localities 20 (left), *Trieces teres;* 21 (right), *T. densus.*

Black. Face, lower lateral corner of frons, cheek, clypeus, and mouth parts light yellow; antenna blackish brown, brown below; tegula fulvous, basally pale yellow; apex of front and middle coxae, trochanters, apex of femora, and basal 0.2 of tibiae, pale yellow; hind coxa black, apically fulvous and its extreme apex pale yellow; apex of segments of hind tarsus light brown; legs fulvous except as described otherwise.

Type: ♂, Kent Co., Mich., July 11, 1951, R. R. Dreisbach (Dreisbach).

Paratype: ♀, Midland Co., Mich., Aug. 5, 1951, R. R. Dreisbach (Dreisbach).

7. Trieces sapineus, new species

Front wing 2.9 to 3.5 mm. long; face about 1.25 as wide as high, its punctures of moderate size, separated by about 0.3 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm making a wedge-shaped dark area around clypeal fovea; eye apparently without hairs; flagellum with 25 segments in male, with about 23 segments in female; metapleurum with about 14 hairs arranged in an elongate triangle along its upper hind margin, the hairy area variable in size and in number of hairs; striae of metapleurum rather fine but sharp, occupying about the posteroventral 0.3 of metapleurum; propodeal spiracle subcircular, its rim confluent with pleural carina; front spur of middle tibia about 0.25 to 0.40 as long as hind spur; second segment of middle tarsus about 2.0 as long as wide in male, about 1.4 as long as wide in female; second abdominal tergite about 0.84 as long as wide in male, about 0.77 as long as wide in female, its punctures rather coarse, subadjacent; sublateral longitudinal carina of third tergite sharp on basal 0.35 of tergite.

There is an eastern and a western subspecies, separable on color as indicated in the key.

1. Hind femur fulvous, with a subapical infuscation above; range: Canadian zone east of the 100th meridian . . . . **7a. sapineus sapineus,** new subspecies
   Hind femur blackish; range: Alaska to Colorado and California. **7b. sapineus litus,** new subspecies

7a. Trieces sapineus sapineus, new subspecies

Figures 179,b; 180,g

Black. Face, clypeus, cheek, lower lateral corner of frons, mouthparts, apex of femora, and basal 0.2 of tibiae, pale yellow; antenna reddish brown below; tegula fulvous, yellow at base; hind coxa black, fulvous apically; hind femur somewhat infuscate subapically above; hind tibia and tarsi often weakly infuscate except toward base; legs fulvous except as described otherwise.

Type: ♀, Mount Washington, N. H., A. T. Slosson (Washington, USNM 63600).

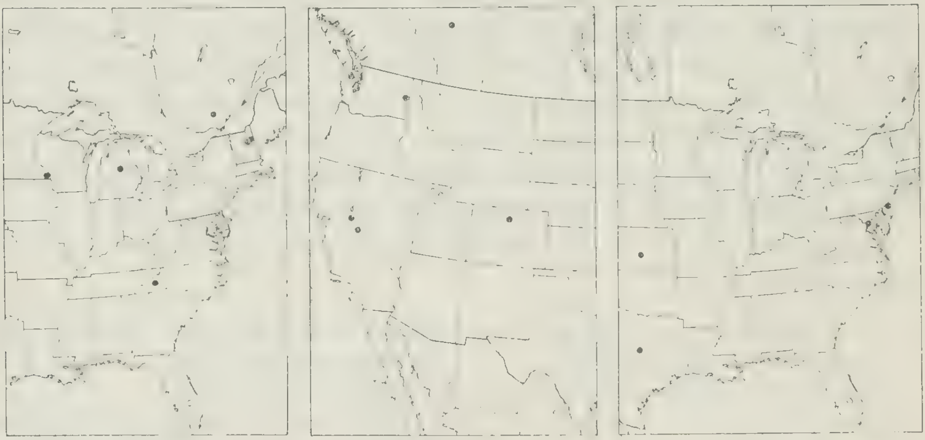
Paratypes: ♀, Midland Co., Mich., Sept. 2, 1944, R. R. Dreisbach (Dreisbach). ♀, Houston Co., Minn., June 14, 1910 (St. Paul). ♀, Pinkham Notch, N. H., Aug. 23, 1951, H., M., and D. Townes (Townes). ♀, Mount Washington, N. H., A. T. Slosson (Philadelphia). ♀, Mount Mitchell, N. C., Aug. 24, 1950, H., M., and D. Townes (Townes). ♀, Montigny, Que., June 9, 1941, O. Peck (Ottawa). ♀, Quebec Province, June 19, 1895 (Ottawa).

This subspecies occurs in the Canadian zone of eastern North America.

7b. Trieces sapineus litus, new subspecies

Figure 179,c

Black. Head and its appendages sometimes (in the specimens from British Columbia and Washington) colored as in the subspecies *sapineus*, but often (in the specimens from Alaska, Alberta, and Colorado) these parts yellowish brown rather than pale yellow and the dorsolateral corner of face and a median area on face blackish, or sometimes the face mostly blackish on its dorsal 0.2; antenna brownish beneath; tegula brown, often yellow at base; apex of femora and basal 0.2 of tibiae yellow; coxae blackish, apically paler (especially the front and middle coxae); trochanters light brown; front and middle femora (except at apex) light brown to blackish; hind femur blackish; tibiae (except on basal 0.2) and tarsi light brown.



Figures 22–24.—Localities: 22 (left), *Trieces sapineus sapineus;* 23 (center), *T. s. litus;* 24 (right), *T. texanus.*

Type: ♀, near Estes Park, Colo., June 12, 1948, H., M., G., D., and J. Townes (Washington, USNM 63601).

Paratypes: ♀, Aspen Beach, Alta., Aug. 23, 1944, O. Peck (Ottawa). ♀, emerged Aug. 25, 1911, from pupa on *Pinus*, British Columbia (Ottawa). ♀, Leevining, Calif., Apr. 24, 1948, H., M., G., and D. Townes (Townes). ♀, near Sonora Pass, 8,500 ft., Calif., July 7, 1948, H., M., G., and D. Townes (Townes). ♀, Mica, Wash., July 14, 1918, A. L. Melander (St. Paul). ♀, Port Angeles, Mount Pleasant District, Wash., July 16, 1945, R. D. Shenefelt (Madison).

This subspecies occurs in the Canadian zone of western North America.

8. Triecces texanus (Cresson)

FIGURES 165,b; 180,h

Exochus texanus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 168; "♂" = ♀. Type: ♀, Bosque Co., Tex. (Washington).

Front wing 4.0 to 5.2 mm. long; face about 1.3 as wide as high in male, about 1.4 as wide as high in female; punctures of face rather coarse and dense, separated by about 0.3 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm making a long line dorsomesad from clypeal fovea; eye of male almost without hairs, of female with very short, sparse hairs; metapleurum with an elongate triangle of hairs in its upper hind portion, without hairs in its upper front corner; striae of metapleurum extending forward nearly or quite to front of metapleurum, but not far dorsad; propodeal spiracle long elliptic, its rim confluent with pleural carina; front spur of middle tibia about 0.38 as long as hind spur; second segment of middle tarsus about 1.8 as long as wide in male, about 0.95 as long as wide in female; second abdominal tergite about 0.76 as long as wide in male, about 0.74 as long as wide in female, with moderate sized, sharp, separate punctures; sublateral longitudinal carina of third tergite extending about 0.4 the length of the tergite.

Black. Face, clypeus, cheek, and mouth parts, yellow, except that mandible of female is brown; face with a small median dorsal area and a crescent next each antennal socket brown; antenna dark brown, paler beneath; tegula fulvous, yellow at base; front and middle legs fulvous, the apex of their femora and basal 0.2 of their tibiae yellowish; hind coxa blackish, apically ferruginous; hind trochanters fulvous; hind femur blackish to fulvous; hind tibia and tarsus fulvous or sometimes somewhat infuscate, the basal 0.2 of the tibia yellowish.

Specimens: ♀, Florida, A. T. Slosson (New York). ♂, Sandhills, Medora, Kans., June 29, 1923, R. H. Beamer (Lawrence). ♀, Takoma Park, Md., June 23, 1943, H. and M. Townes (Townes). ♂, 3♀, Moorestown, N. J., June 21, June 30, July 3, and July 12, all in 1939, H. and M. Townes (Townes). ♂ (type), Bosque Co., Tex., G. W. Belfrage (Washington).

II. INTEGER GROUP

Eye bare or with hair of various lengths and density; metapleurum bare of hairs except often for a very few in its extreme upper front corner and rarely one to three discal hairs of random distribution (figs. 181,a to 182,a). Otherwise similar to the *texanus* group.

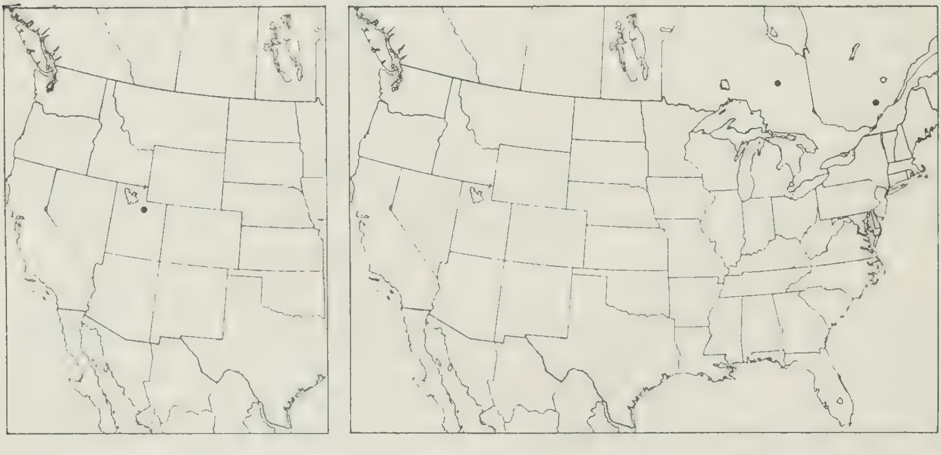
This group includes the nine Nearctic species described below, *T. platysoma* Townes 1946, from Mexico, and an undescribed species from southern Brazil.

9. Trieces ejectus, new species

FIGURE 181,a

Male type: Front wing 4.2 mm. long; face 1.1 as wide as high, with moderate-sized sharp punctures, their interspaces about 0.5 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm visible as a dark curved mark crossing the clypeal fovea, extending a long distance dorsomesad of the fovea and a short distance ventrolaterad; eye with short sparse hairs; flagellum with 31 segments; front spur of middle tibia 0.50 as long as hind spur; second segment of middle tarsus 2.25 as long as wide; metapleurum without hairs, with rather close sharp wrinkles that occupy all but its front upper part and its anterior 0.25.

Black. Face, lower lateral part of frons to just below center of eye emargination, cheek, clypeus, front and middle trochanters, and tibial spurs yellowish white; clypeal fovea and attachment of front tentorial arm brown; flagellum brown beneath, blackish brown above; tegula brown with a basal whitish spot; front and middle coxae yellowish white, fulvous basally; front and middle femora fulvous, pale yellow at apex; front and middle tibiae pale fulvous, yellowish



FIGURES 25, 26.—Localities: 25 (left), *Trieces ejectus;* 26 (right), *T. walleyi.*

white on basal 0.2; front and middle tarsi yellowish white basally, stramineous apically; hind coxa black, its apex fulvous; hind trochanters fulvous; hind femur blackish brown, fulvous basally, yellowish on extreme apex; hind tibia yellowish on its basal 0.2, the rest light reddish brown, infuscate dorsally; hind tarsus dark brown.

Type: ♂, Strawberry Daniel Pass, Wasatch Co., Utah, June 19, 1948, H., M., G., and D. Townes (Washington, USNM 63602).

10. Triclistus walleyi, new species

FIGURE 181,b

Front wing 4.2 to 5.2 mm. long; face 1.25 as wide as high, with small subadjacent punctures; face and clypeus in profile strongly convex; attachment of front tentorial arm visible as a dark curved mark crossing the clypeal fovea, extending a long distance dorsomesad from the fovea and a short distance ventrolaterad; eye of male apparently bare; eye of female with short sparse hairs; flagellum of type with 26 segments, the flagellum of paratypes broken; front spur of middle tibia about 0.53 as long as hind spur; second segment of middle tarsus about 1.75 as long as wide in male, about 1.1 as long as wide in female; metapleurum without hairs except in its upper front corner, its lower 0.3 with weak coarse wrinkles.

Male: Black. Face, clypeus, lower lateral part of frons to well above center of eye emargination, front part of cheek, mouth parts, and tegula, yellowish white, the tegula tinged with fulvous apically; antenna blackish brown, brown beneath; front and middle trochanters and coxae pale yellow, the coxae fulvous basally; front and middle femora and tibiae fulvous, the femora yellowish at apex and tibiae yellowish white on basal 0.2; tibial spurs yellowish white; tarsi yellowish white basally, brownish apically; hind coxa black, fulvous at extreme apex; hind trochanters fulvous; hind femur blackish, fulvous at base and yellowish at extreme apex; hind tibia light reddish brown, its basal 0.2 stramineous.

Female: Black. Face, clypeus, lower lateral part of frons to well above center of eye emargination, front part of cheek, mouth parts, and tegula, brownish yellow, the tegula tinged with fulvous apically; antenna blackish brown, reddish brown beneath; extreme apex of femora and basal 0.2 of tibiae tinged with yellow, the rest of legs ferruginous with the hind coxa weakly infuscate basally.

Type: ♀, reared from *Herculia thymetusalis*, Kapuskasing, Williamson Township, Ont., July 18, 1942 (Ottawa).

Paratypes: ♂, same data as type, but emerged July 16, 1942 (Ottawa). ♀, reared from Pyralidae, Windigo, Que., emerged 1938 (Ottawa).

11. Trieces integer, new species

FIGURE 181,c

Front wing 3.5 to 3.8 mm. long; face about 1.15 as wide as high, its punctures of moderate size and strength, the interspaces about 0.5 their diameter; face and clypeus in profile strongly convex; attachment of front tentorial arm visible as a dark, narrowly lanceolate area around the clypeal fovea; eye apparently without hairs; flagellum with about 31 segments in male and about 25 segments in female; median segments of female flagellum about 1.0 as long as wide; front spur of middle tibia about 0.52 as long as hind spur; second segment of middle tarsus about 2.15 as long as wide in male, about 1.85 as long as wide in female; metapleurum without hairs except for usually a very few in its upper front corner and sometimes one to three scattered on its disc; wrinkles on metapleurum few, moderately strong, occupying the median part of its lower 0.3.

Male: Black. Face, lower lateral corner of frons, front part of cheek, clypeus, and mouth parts, pale yellow; antenna blackish brown, tinged with reddish brown below; tegula dark fulvous to dark brown, pale yellow basally; front and middle coxae pale yellow, fulvous basally; front and middle trochanters pale yellow; apex of front and middle femora and base of front and middle tibia tinged with pale yellow; hind coxa black, ferruginous apically; hind tarsus infuscate brown; legs fulvous except as described otherwise.

Female: Black. Face, front part of cheek, and clypeus fulvous; lower lateral corner of frons yellowish fulvous; mouth parts reddish brown; antenna reddish brown, darker above; tegula dark reddish brown; legs fulvoferruginous, the hind coxa more or less black except apically and the hind femur occasionally brownish.

This species is rather close to the Mexican *T. platysoma* Townes, 1946, which differs in having the body a little more depressed, the

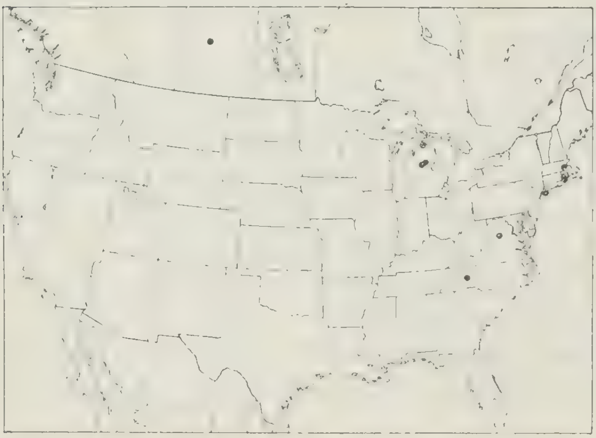


FIGURE 27.—Localities for *Trieces integer.*

yellow on frons a little more extensive, the hind femur fuscous, and the bases of the tibiae tinged with yellow.

Type: ♀, Farmingdale, N. Y., Aug. 11, 1938, H. and M. Townes (Washington, USNM 63603).

Paratypes: ♂, Holliston, Mass., Aug. 3, N. Banks (Cambridge). ♂, Cheboygan Co., Mich., July 31, 1930, H. B. Hungerford (Townes). ♂, Cheboygan Co., Mich., Aug. 8, 1943, R. R. Dreisbach (Dreisbach). ♂, ♀, Clare Co., Mich., Sept. 4, 1950, R. R. Dreisbach (Dreisbach). ♀, Gladwin Co., Mich., July 20, 1939, R. R. Dreisbach (Washington). ♀, Farmingdale, N. Y., Aug. 7, 1938, H. and M. Townes (Townes). ♀, Crabtree Meadows in Yancey Co. at 3,600 ft., N. C., Aug. 21, 1950, H. M., D., and J. Townes (Townes). ♀, Hopkinton, R. I., Aug. 31, 1946, M. Townes (Townes). ♂, ♀, Kingston, R. I., Aug. 11, 1946, M. Townes (Townes). 2♂, Saskatoon, Sask., Aug. 5, 1925, and Aug. 17, 1926, Kenneth M. King (Ottawa). 39♂, flying over blackberry (*Rubus*) tangles, Skyline Drive, Va., Aug. 5, 1945, H. and M. Townes (Townes).

This species appears to occur among scattered oaks, in the Alleghenian fauna. Adults occur during the last half of summer.

12. Trieces fusus, new species

FIGURE 181,d

Front wing 3.3 to 3.8 mm. long; flagellum with 26 or 27 segments in male, with about 20 segments in female; flagellum of female unusually short and fusiform, its median segments about 0.85 as long as wide; metapleurum without discal hairs in any of the specimens at hand.

Antenna of male dark brown, stramineous below, the scape and pedicel almost clear pale yellow below; hind femur of female ferruginous to brown, usually tinged with brown; hind tarsus of male stramineous.

Structure and color similar to that of *Trieces integer*, except as described above.

Type: ♀, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Washington, USNM 63604).

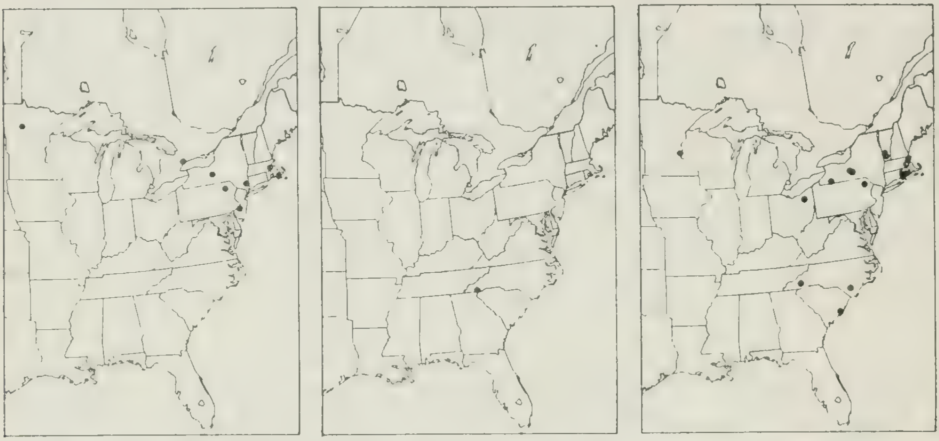
Paratypes: 2♀, Holliston, Mass., August 3 and 5, N. Banks (Cambridge). ♀, Woods Hole, Mass. (Cambridge). ♀, Itasca Park, Minn., September 1927, S. Garthside (Washington). 2♀, Moorestown, N. J., Aug. 6, 1939, H. and M. Townes (Townes). ♂, Ithaca, N. Y., July 23, 1939, P. P. Babiy (Townes). ♀, Toronto, Ont., Aug. 10, 1896, D. G. Cox (Washington). ♂, Spring Brook, Pa., July 11, 1945, H. Townes (Townes).

This is a species of the Alleghenian fauna. Adults occur during the last half of summer.

13. Trieces aquilus, new species

FIGURES 179,d; 181,e

Female type: Front wing 2.8 mm. long; face 1.05 as wide as high, with coarse strong punctures, their interspaces about 0.2 their diameter; face and clypeus in profile rather weakly curved; clypeal fovea and attachment of front tentorial arm not distinct; eye apparently without hairs; flagellum with 20 segments; front spur of middle tibia 0.35 as long as hind spur; second segment of middle tarsus 1.6 as long as wide; metapleurum without hairs, with close sharp wrinkles in its lower 0.25.



FIGURES 28–30.—Localities: 28 (left), *Trieces fusus;* 29 (center), *T. aquilus;* 30 (right), *T. sparsus*

Black. Interantennal process broadly margined with yellowish white; mandible mostly yellowish white; palpi stramineous; flagellum blackish brown, brown below; tegula brown with a yellowish basal spot; hind coxa dark brown; hind femur dark brown, its base and apex light brown; basal 0.2 of tibiae pale yellowish; legs light brown except as described otherwise.

Type: ♀, Highlands, N. C., Oct. 13, 1941, H. and M. Townes (Washington, USNM 63605).

14. Trieces sparsus, new species

FIGURE 181,f

Front wing 2.8 to 4.0 mm. long; face about 1.1 as wide as high, its punctures small and rather sharp, their interspaces about 0.5 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm visible as a dark area surrounding clypeal fovea and with a short appendage extending dorsomesad; eye of male bare, of female with rather sparse short hairs; flagellum of male with about 31 segments, of female with about 21 segments; front spur of middle tibia about 0.50 as long as hind spur; second segment of middle tarsus about 2.0 as long as wide in male, about 1.5 as long as wide in female; metapleurum without hairs, with an area of close sharp wrinkles occupying the central part of its lower 0.4.

Black. Face, lower lateral corner of frons to just below center of eye emargination, front part of cheek, clypeus, and mouthparts, pale yellow in male, stramineous in female; flagellum blackish brown, tinged with reddish brown beneath; tegula fulvous brown with a basal pale yellow spot; legs light fulvous, the front and middle coxae apically, front and middle trochanters, apex of front and middle femora, base of front and middle tibiae, and the front and middle tarsi, stramineous; hind coxa blackish, fulvous apically; hind trochanters fulvous; hind femur reddish brown to blackish brown, the extreme apex and the basal 0.12 to 0.6 fulvous brown; hind tibia whitish on its basal 0.2, the rest light fulvous brown, infuscate dorsally; hind tarsus infuscate brown.

Type: ♀, Elizabethtown, N. C., April 25, H. Townes (Washington, USNM 63606).

Paratypes: 30♂, 4♀ from Connecticut (Sterling and Voluntown); Minnesota (Washington Co.); Massachusetts (Auburndale and Holliston); New York (Ithaca, Rock City in Cattaraugus Co., and West Danby): North Carolina (Mount Pisgah at 4,800 to 5,300 ft.); Ohio (Summit Co.); Pennsylvania (Spring Brook); Rhode Island (Kingston); South Carolina (McClellanville); and Vermont (Manchester and Mount Equinox). There are 10 collection dates from June 3 to 26 in various localities, other dates are: April 25 at Elizabethtown, N. C.; May 12 and 14 at McClellanville, S. C.; May 25 at Ithaca, N. Y.; May 30 at West Danby, N. Y.; August 8 at Sterling, Conn.; Aug. 11 at Kingston, R. I.; and August 25 at Spring Brook, Pa.

This species occurs from the Canadian to the Lower Austral zone in eastern North America. There seems to be a late spring brood of adults that lasts through June, and a second brood that occurs in August.

15. Trieces marlatti (Ashmead)

FIGURE 181,g

Chorinaeus marlatti Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 200; ♀. Type: ♀, Riley Co., Kans. (Washington).

Front wing 3.1 to 3.3 mm. long; face about 1.05 as wide as high, with small sharp punctures, their interspaces about 0.5 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm visible as a dark area surrounding clypeal fovea and with a linear appendage extending dorsomesad; eye with rather long, moderately dense hairs; flagellum with 32 segments in male, with about 25 segments in female; front spur of middle tibia about 0.53 as long as hind spur; second segment of middle tarsus 2.5 as long as wide in male, about 1.5 as long as wide in female; metapleurum with a few hairs in its upper front corner, elsewhere bare, its wrinkles rather fine, occupying the lower hind third of its area.

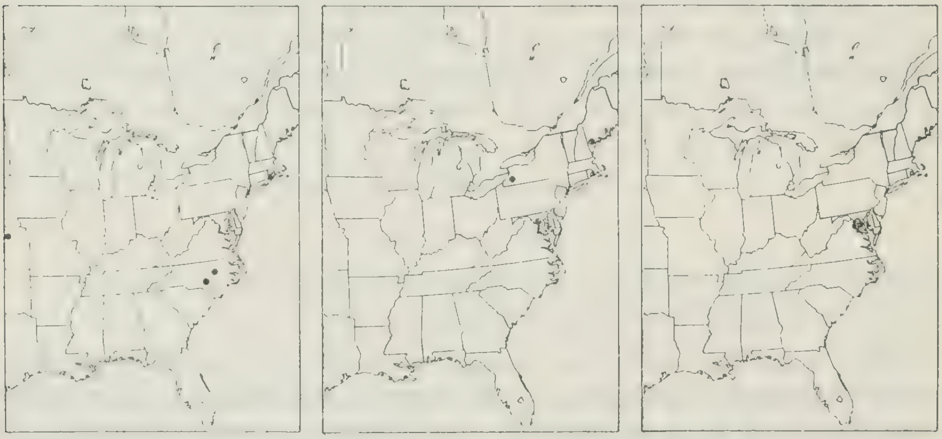
Black. Male face, cheek, clypeus, and mouth parts, ivory; female face, cheek, clypeus, and mouth parts fulvous, the mandible somewhat darker; lower lateral part of frons of both sexes to well above center of eye emargination yellowish; antenna blackish brown, in male tinged with stramineous below, in female brown below; tegula brown with a yellow basal spot; legs fulvous, the front and middle tibiae basally yellowish and basal 0.2 of hind tibia pale yellow; front and middle coxae and trochanters of male pale yellow, the coxae fulvous basally; front and middle tarsi of male and apex of front and middle femora of male pale yellow.

Specimens: ♀ (type), Riley Co., Kans., C. L. Marlatt (Washington). ♂, found in pitcher of *Sarracenia flava*, Raleigh, N. C., May 11, 1939, D. L. Wray (Townes). ♀, Southern Pines, N. C., Oct. 31, 1950, H. Townes (Townes). ♀, Hopkinton, R. I., Aug. 3, 1946, M. Townes (Townes).

16. Trieces bradleyi, new species

FIGURE 181,h

Female: Front wing 2.6 to 2.8 mm. long; face about 1.1 as wide as high, with moderate sized weak punctures, their interspaces about 0.3 their diameter; face and clypeus in profile moderately convex; attachment of front tentorial arm visible as a dark area around clypeal fovea and a short appendage extending dorsomesad; eye with



FIGURES 31–33.—Localities: 31 (left), *Trieces marlatti;* 32 (center), *T. bradleyi;* 33 (right), *T. ciliosus.*

rather long, moderately dense hairs; flagellum with about 21 segments; front spur of middle tibia about 0.50 as long as hind spur; second segment of middle tarsus about 1.7 as long as wide; metapleurum with a few hairs in its upper front corner, the rest bare, with rather strong radiating wrinkles in its lower 0.3.

Black. Face, clypeus, tegula, and legs light brownish fulvous, the tibiae basally a little paler and the hind coxa sometimes basally brownish; mandible and antenna brown; palpi stramineous.

Type: ♀, Casco, Maine, Aug. 13, 1944, J. C. Bradley (Washington, USNM 63607).

Paratypes: ♀, Cabin John, Md., R. M. Fouts (Washington) ♀, Bemus Point, N. Y., Aug. 21, 1937, H. Townes (Townes).

17. Trieces ciliosus, new species

FIGURE 182,a

Front wing 2.8 to 3.0 mm. long; face about 0.95 as wide as high, its punctures coarse and subadjacent; face and clypeus in profile weakly convex; attachment of front tentorial arm visible as a dark circle around clypeal fovea with a short, linear, dorsomesal appendage; eye with long, rather dense hairs; flagellum with about 25 segments; front spur of middle tibia about 0.52 as long as hind spur; second segment of middle tarsus 2.0 as long as wide in male, about 1.25 as long as wide in female; metapleurum with a few hairs in its upper front corner, elsewhere bare, with rather fine, short, radiating wrinkles next to its coxal attachment.

Black. Face, front part of cheek, clypeus, and mouth parts, pale yellow; antenna blackish brown, a little paler below; front and middle legs brownish fulvous, their tibiae basally pale yellow; hind coxa and femur dark brown, the coxa at apex and the femur at base and apex pale brown; hind trochanters pale brown; hind tibia and tarsus brown, the basal 0.2 of hind tibia whitish.

Type: ♀, Hyattsville, Md., Oct. 7, 1888, T. Pergande (Washington, USNM 63608).

Paratypes: ♂, Takoma Park, Md., Sept. 24, 1944, H. and M. Townes (Townes). ♀, Falls Church, Va., July 21, 1920, William Middleton (Washington).

III. DENTATUS GROUP

Head of moderate width; body rather elongate; attachment of front arm of tentorium visible as a long arched line extending from clypeal fovea ventrolaterally and farther dorsomedially along the clypeal suture; eye with short, sparse hairs; mesopleurum in its lower hind corner with a weak, wedge-shaped ripple but without sharp wrinkles (figs. 182,b,c); metapleurum without a vertical pit in its hind end.

often with a continuous band of hairs along its upper edge, the hairs arising from very fine punctures, elsewhere the metapleurum polished, below the middle with broad gentle rippling, over base of hind coxa smooth and gently convex; median and sublateral longitudinal carinae of third tergite nearly reaching apex of tergite; fourth tergite with median and sublateral longitudinal carinae present basally.

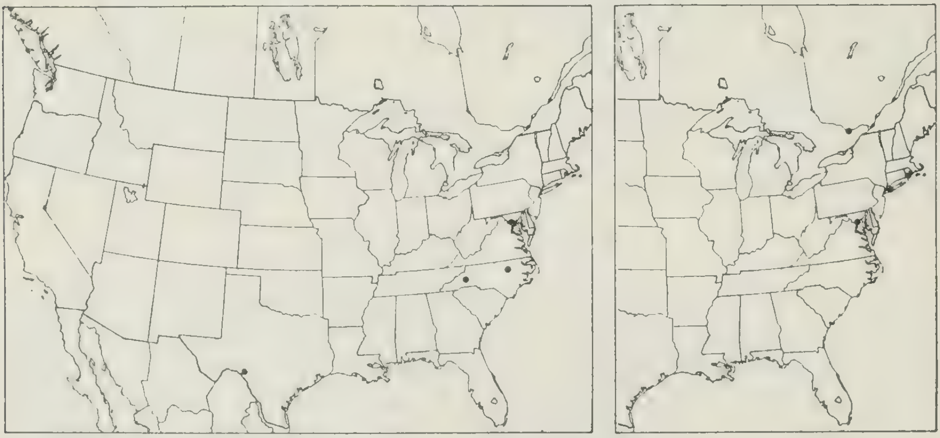
Two Nearctic and two unidentified Neotropic species of this group are before us. The Neotropic species comprise one from Costa Rica and another from Guatemala, British Guiana, and Argentina. The two Nearctic species are treated below.

18. Trieces calvatus, new species

FIGURE 182,b

Front wing 3.5 to 4.2 mm. long; face in profile weakly convex, its punctures rather coarse and strong, their interspaces about 0.25 their diameter; flagellum with about 29 segments in male, with about 24 segments in female; third segment of maxillary palpus about 3.0 as long as wide; prepectal carina continuing dorsally till it reaches front edge of mesopleurum; lateral carina of scutellum not projecting beyond apex of scutellum to form a tooth; metapleurum with about six strong, straight, sublongitudinal rugae, without hairs; front spur of middle tibia about 0.42 as long as hind spur; second segment of middle tarsus about 2.0 as long as wide in male, about 1.33 as long as wide in female; median and sublateral longitudinal carinae of fourth tergite extending about half the length of tergite; sublateral carina on third tergite weakly curved.

Black. Face, side of frons, clypeus, and mouth parts, yellow tinged with fulvous; antenna fulvous brown, paler below and basally; tegula fulvous, yellow at base; legs fulvous, the extreme apex of femora, basal



FIGURES 34, 35.—Localities: 34 (left), *Trieces calvatus;* 35 (right), *T. dentatus.*

0.23 of tibiae, tibial spurs, and front and middle coxae and trochanters of male, yellowish, the hind coxa and femur reddish brown to black; abdomen ferruginous on apical part of fifth tergite and on sixth and following segments.

Type: ♀, Glen Echo, Md., July 1925, R. M. Fouts (Washington, USNM 63609).

Paratypes: ♀, Takoma Park, Md., Aug. 25, 1943, H. and M. Townes (Townes). ♀, Marion, N. C., Aug. 29, 1950, H., M., and D. Townes (Townes). ♀, Wake Co., N. C., July 1, 1951, H. and M. Townes (Townes). ♂, Devils River, Tex., May 6, 1907, F. C. Bishopp (Washington).

19. Triceces dentatus, new species

FIGURE 182,c

Front wing 4.4 to 5.2 mm. long; face in profile weakly convex, its punctures coarse and strong, their interspaces about 0.25 their diameter; flagellum with about 39 segments in male, with about 34 segments in female; third segment of maxillary palpus about 1.6 as long as wide in male, about 1.3 as long as wide in female; dorsal part of prepectal carina absent, the carina not reaching front edge of mesopleurum; lateral carina of scutellum projecting beyond apex of scutellum to form an acute tooth; metapleurum almost smooth except for a prominent juxtacoxal carina, with a band of numerous hairs along its upper margin, the hairs arising from minute punctures; front spur of middle tibia about 0.46 as long as hind spur; second segment of middle tarsus about 1.9 as long as wide in male, about 1.15 as long as wide in female; median and sublateral longitudinal carinae extending entire length of fourth tergite, in male present also on fifth tergite; sublateral carina on third tergite weakly curved.

Black. Face, side of frons, clypeus, cheek, and mouth parts, yellow tinged with fulvous, the palpi pale yellow; antenna brown, paler beneath, the under side of scape pale fulvous; tegula fulvous, yellow at base; legs fulvous, the extreme apex of femora, basal 0.23 of tibiae, and tibial spurs, yellowish; tinges on front and middle coxae and trochanters of male yellow; abdomen ferruginous on sixth and following segments, the sixth tergite basally infuscate, especially in males. In one female specimen the thorax is ferruginous rather than black, and the abdomen is tinged with ferruginous.

Type: ♀, Farmingdale, N. Y., July 26, 1938, H. and M. Townes (Washington, USNM 63610).

Paratypes: 2♀, Takoma Park, Md., Aug. 12, 1943, H. and M. Townes (Townes). ♀, Eastport, N. Y., July 23, 1938, H. and M. Townes (Townes). 3♀, Farmingdale, N. Y., July 17, July 29, and August 21, all in 1938, H. and M. Townes (Townes). ♂, ♀, Constance

Bay, Ont., June 18, 1935, F. A. Urquhart (Ottawa). ♂, Constance Bay, Ont., Aug. 17, 1933, G. S. Walley (Ottawa). 2♀, Constance Bay, Ont., July 20, 1933, and Aug. 8, 1935, G. S. Walley (Ottawa). ♂, "Cynthia Township," emerged in incubator from Geometridae, Apr. 4, 1947 (Ottawa). ♂, "Law Township," emerged in incubator from Geometridae, Apr. 11, 1947 (Ottawa). ♂, "Petit Lac Travers," emerged in incubator from Geometridae, Apr. 3, 1941 (Ottawa). ♀, Westerly, R. I., Aug. 22, 1946, M. Townes (Townes).

This species occurs in the Carolinian fauna. It has been reared three times from geometrids.

IV. ONITIS GROUP

Head wide to very wide; body moderately short; eye with short sparse hairs; mesopleurum in its lower hind corner with fine longitudinal wrinkles; metapleurum with a vertical slotlike pit in its hind end, broadly hairy along its upper margin, rather sharply punctate in the hair band, and with sharp longitudinal wrinkles except in its upper front third (fig. 182,d); median and sublateral carinae of third tergite present basally but absent beyond its middle; fourth tergite without median or sublateral longitudinal carinae.

We have seen four species of this group, the three Nearctic species treated below and an undescribed species from the mountains of northern Luzon in the Philippines.

20. Trieces arcuatus, new species

Figure 182,d

Front wing 4.2 to 5.9 mm. long; face about 1.6 as wide as high; face and clypeus in profile with an unbroken, evenly convex surface; middle half of apical margin of clypeus truncate or weakly convex; flagellum

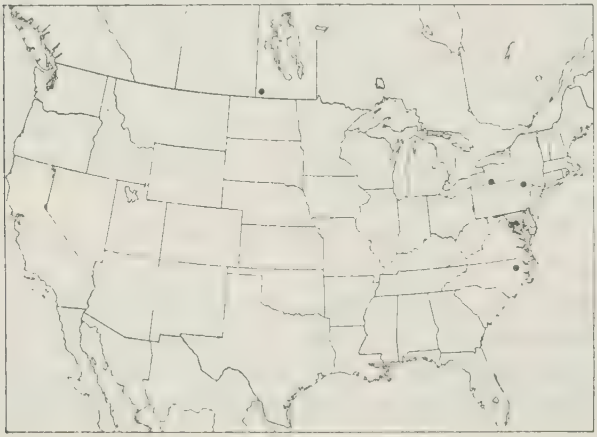


Figure 36.—Localities for *Trieces arcuatus.*

with about 36 segments in male, with about 40 segments in female; front spur of middle tibia about 0.34 as long as hind spur in male, about 0.48 as long as hind spur in female; second segment of middle tarsus about 2.05 as long as wide in male, about 1.85 as long as wide in female.

Both sexes colored as in *T. onitis*, except that the female mandible is yellow.

Type: ♀, Takoma Park, Md., July 17, 1943, H. and M. Townes (Washington USNM 63611).

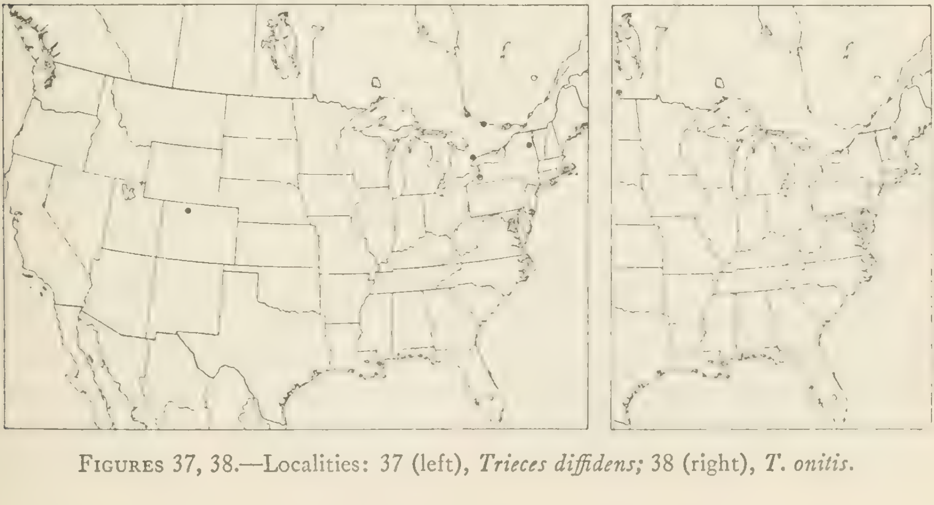
Paratypes: ♂, Pierson, Man., July 3, 1927, H. J. Brodie (Ottawa). ♀, Takoma Park, Md., June 20, 1943, H. and M. Townes (Townes). ♂, Rock City in Cattaraugus Co., N. Y., June 9, 1915 (Washington). ♀, Rocky Mount, N. C., June 21, 1951, H. Townes (Townes). ♂, Spring Brook, Pa., May 24, 1945, H. Townes (Washington). ♂, Black Pond in Fairfax Co., Va., June 19, 1919, William Middleton (Washington).

This species occurs in the Alleghenian and Carolinian faunas.

21. Trieces diffidens, new species

Front wing 3.7 to 4.5 mm. long; face about 1.6 as wide as high; face and clypeus in profile with an unbroken, evenly convex surface, or slightly flattened below; middle half of apical margin of clypeus faintly (most males) to distinctly (females) concave; flagellum with about 33 segments in male, with about 32 segments in female; front spur of middle tibia about 0.36 as long as hind spur; second segment of middle tarsus about 1.5 as long as wide in male, about 1.4 as long as wide in female.

Both sexes colored as in *T. onitis*, except that the female mandible is yellow.



FIGURES 37, 38.—Localities: 37 (left), *Trieces diffidens;* 38 (right), *T. onitis.*

Type: ♀, southern New Jersey, 1895, Chas. Liebeck (Washington, USNM 63612).

Paratypes: ♀, Steamboat Springs, Colo., July, C. F. Baker (Washington). ♂, reared from *Tetralopha* sp. on *Fagus*, Bar Harbor, Maine, host collected Sept. 10, 1945, parasite emerged Mar. 27, 1946 (Washington). ♀, Takoma Park, Md., May 31, 1942, H. and M. Townes (Townes). ♂, Fall River, Mass., July 3, 1908, N. S. Easton (Cambridge). ♂, Bemus Point, N. Y., June 19, 1937, H. Townes (Townes). ♀, Heart Lake in Essex Co., N. Y., June 28, 1940, H. Dietrich (Ithaca). ♂, Mattituck, N. Y., Aug. 10, 1946, Roy Lathan (Washington). ♂, reared from *Psilocorsis fletcherella*, Deux Rivières, Ont., 1945 (Ottawa). ♀, Swansea near Toronto, Ont., July 30, 1938, H. S. Parish (Townes). ♂, reared from *Psilocorsis fletcherella*, Temiskaming, Ont., 1945 (Ottawa). ♀, Aylmer, Que., May 18, 1934, G. S. Walley (Ottawa). 2♂, Hull, Que., May 30 and 31, 1903 (Ottawa). ♀, no data (Ottawa).

This species is widespread in the Transition zone from the Atlantic Coast to Colorado.

22. Triecces onitis (Davis)

FIGURE 179,e

Chorinaeus onitis Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 210; ♂, ♀. Lectotype: ♀ Mount Washington, N. H. (Philadelphia).

Front wing 4.8 to 5.5 mm. long; face 1.89 as wide as high in male, 1.91 to 2.25 as wide as high in female; face in profile strongly bulged above clypeus; middle half of apical margin of clypeus strongly concave; flagellum of the single male specimens broken, in female specimens with about 30 segments; front spur of middle tibia about 0.47 as long as hind spur; second segment of middle tarsus of male 2.0 as long as wide, of female about 1.05 as long as wide.

Male: Black. Face, clypeus, cheek, lower part of temple, large ventrolateral area on frons, mouth parts, front and middle legs except for fulvous tinge on femora behind, apex of hind coxa beneath, tinge on hind trochanters, tinge on apex of hind femur, basal 0.25 of hind tibia, and tibial spurs, pale yellow; antenna brown, pale yellow beneath but shading to light brown toward apex; tegula yellow, reddish brown apically; hind coxa blackish except apically beneath; hind leg beyond coxa fulvous except where described as yellow.

Female: Black. Face, clypeus, cheek, lower part of temple, large ventrolateral area on frons, mouth parts except mandible, under side of scape and pedicel, apex of femora, and basal 0.2 of tibiae, pale yellow; mandible light brown to dark brown; flagellum reddish brown, paler below; tegula dark brown; legs fulvous except where described as yellow, the middle coxa infuscate basally, the hind coxa blackish except at apex, and front and middle trochanters and apex of front and middle coxae more or less tinged with pale yellowish. Sometimes the ground color of the legs is brownish rather than fulvous.

Specimens: ♀, Baldur, Man., June 23, 1924, R. D. Bird (Ottawa). ♂, 2♀, (lectotype and paratypes), Mount Washington, N. H., A. T. Slosson (Philadelphia). ♂, Mount Washington, N. H., A. T. Slosson (New York). ♀, Mount Washington, N. H., June 15, Nelson (Cambridge).

5. Genus Hemimetopius

FIGURE 166,a

Hemimetopius Benoit, 1955, Ann. Mus. Congo Belge, ser 8, vol. 36, p. 344.
Type: *Hemimetopius kayoveanus* Benoit; original designation.

Front wing about 5 mm. long; front spur of middle tibia about 0.8 as long as hind spur; thorax in dorsal view pyriform, somewhat swollen anteriorly; pronotum dorsally roundly curved toward its dorsal margin, except that there is a broad, faint impression near its margin; scutellum quadrate, a little wider than long, its lateral carina strong and produced apically as in the genus *Metopius;* mesopleural suture absent; posterior transverse carina of mesosternum complete, not interrupted in front of the middle coxae (this carina incomplete in all other Metopiinae); metapleurum with fine setiferous punctures all over, without sharp wrinkles; second tergite with a sharp median longitudinal carina, without a distinct sublateral carina; third tergite with a fine sharp median longitudinal carina, without a sublateral carina. Structure otherwise as described for *Chorinaeus.*

This is an Ethiopian genus. Two species were described by Benoit in 1955 and a specimen from Nigeria that appears to represent a third species is in the U. S. National Museum. This specimen was used for the generic description above and for preparing the figure.

6. Genus Metopius

Front wing 6 to 16 mm. long; body punctation coarse and strong; face with most of its surface occupied by a flat or concave escutcheon-shaped area that is bounded by a carina; interantennal process of face variously shaped, according to the subgenus; temple moderately short to very short, convex to flat; occipital carina present above, the rest present or absent according to the subgenus; cheek short; mandible with its lower tooth much smaller than its upper tooth or sometimes lacking; flagellum moderately slender to thickened, often somewhat flattened, long to rather short; upper margin of pronotum not thickened or slightly thickened; propleurum moderately convex; scutellum short, transverse, dorsolaterally with a winglike flange that extends apically as a prominent point; areolet present, large; nervulus opposite basal vein to beyond it by about 0.3 its length; nervellus broken above the middle; prepectal carina various, according to the subgenus; sternaulus a long, broad groove; metapleurum covered with coarse punctures, or rarely the punctures are very sparse; propodeal carinae as in figures 166,b to 169,b; propodeal spiracle a long slit; suture between second trochanter and femur of front and middle legs obsolete; middle tibia with one spur; hind tibia with two spurs; front and middle tarsal claws pectinate or apparently simple; hind tarsal claws apparently simple; abdomen usually parallel-sided, strongly punctate, usually strongly convex above; first tergite quadrate, usually stout, its spiracle near its basal 0.25, its median longitudinal carinae and sublateral carinae extending to its apex, usually strong; second tergite often with a short weak sublateral carina; third to fifth tergites occasionally with a thin median carina; epipleura of all exposed tergites large and separated from tergite by a crease; eighth and following tergites of male retracted; seventh and following tergites of female retracted; female sixth sternite a large unspecialized sclerite.

This genus is worldwide in distribution and contains a rather large number of species. Collectors, however, consider *Metopius* to be among the rarest of the ichneumon flies and very few persons have ever found a species common. On one occasion we found *Metopius mimicus* abundant, and we have sometimes taken more than one specimen of *Metopius xanthostigma* and *M. krombeini krombeini* in a day. Except for these three our catches of Nearctic species have been only occasional and sporadic.

Metopius adults frequent relatively dry, open places, and cruise at about 0.5 to 3 meters height, at the tops of weeds or bushes, or along the outside edges of woods, much in the manner of a *Eumenes* or other eumenine wasps. In coloration they mimic wasps, particularly eumenine wasps. In many species the resemblance is heightened by the front third of the front wing being darker (to mimic the longitudinally folded front wing of the Vespidae). In flight the end of the abdomen is curled downward as in *Eumenes*. In the field, the longer antennae is the most conspicuous character that identifies them as ichneumonids. When captured, all the species (so far as observed) give a high-pitched, wasp-like buzz. *Metopius* and *Alomya* are the only ichneumonids known to buzz like this.

Beginning with Clément (1930, Konowia, vol. 8, pp. 325–437), there has been a tendency to divide *Metopius* into subgenera. In some ways these subgenera are more like species groups, but since the tradition of calling them subgenera seems to be established, it is continued in this paper, and expanded by the erection of two new subgenera.

Key to the subgenera of Metopius

1. Lower tooth of mandible absent or present, when present attached to lower outer edge of upper tooth, not or weakly impressed inward toward mouth; interantennal process of face compressed and with a median carina except in some non-Nearctic species of the subgenus *Metopius* 2

   Lower tooth of mandible present, impressed inward toward mouth so that it is not on lower outer edge of upper tooth; interantennal process of face without a median carina; margin of clypeus not reflexed or raised from base of labrum 4

2. Second recurrent vein with 2 bullae (fig. 166,b), interantennal process projecting forward a little to form a compressed tubercle at top of face (fig. 166,b), lower tooth of mandible basad of upper tooth by about 1.3 the basal width of upper tooth, hind femur about 4 times as long as deep (fig. 166,b). Palaearctic . . . . **1. Peltocarus**

   Second recurrent vein with 1 bulla, or rarely with 2; interantennal process not projecting forward (figs. 167,a, and 168,a,b); lower tooth of mandible absent, or if present basad of upper tooth by more than 1.5 the basal width of upper tooth; hind femur about 3 times as long as deep (figs. 167,a, 168,a,b) 3

3. Occipital carina extending below level of center of foramen magnum, in the majority of cases complete to the hypostomal carina; flagellum not short and blunt, its wider segments 1.2 to 1.85 as wide as long (fig. 167,a); lower tooth of mandible often present but small; claws of front and middle tarsi apparently simple, or sometimes pectinate on their basal 0.3. Holarctic, Oriental, and Australian . . . . **2. Metopius**

   Occipital carina absent below level of center of foramen magnum; flagellum thick and blunt, the wider segments 2.0 to 3.0 as wide as long (figs. 168,a,b); lower tooth of mandible entirely absent; claws of front and middle tarsi pectinate on basal 0.3 to 0.65, or pectinate throughout. Nearctic. **3. Cultrarius**

4. Prepectal carina turned weakly forward above sternaulus, gradually approaching front edge of mesopleurum but ending well separated from it (fig. 167,b); interantennal process strongly concave and with wide raised lateral flanges. Neotropic and Nearctic . . . . **4. Peltales**

   Prepectal carina turned sharply forward above sternaulus, abruptly approaching front edge of mesopleurum, then closely paralleling it (fig. 169,a,b); interantennal process flat, convex, or concave, without strong lateral flanges 5

5. Frons with a median lamella which is continuous with upper end of interantennal process of face. Holarctic . . . . **5. Tylopius**

   Frons with a separate median horn or compressed tooth which is connected with upper end of interantennal process of face by a ridge. Palaearctic and Oriental . . . . **6. Ceratopius**

1. Subgenus Peltocarus

FIGURE 166,b

Peltocarus Thomson, 1887, Deutsche Ent. Zeitschr., vol. 31, p. 196. Type: *Peltocarus croceicornis* Thomson; designated by Viereck, 1914.

Clémontia Michener, 1941, Pan-Pacific Ent. vol 17, p. 2; new synonymy. Type: *Ichneumon micratorius* Fabricius; original designation.

Facial shields omewhat escutcheon-shaped, but the sides converging ventrally and continued across the bottom in a parabolic curve and the upper margin broadly pointed medially, where the interantennal process runs down into the shield as a ridgelike tubercle; interantennal process prominent, compressed, produced a little forward and running into upper corner of facial shield; margin of clypeus projecting well beyond base of labrum, truncate medially, curved at the lateral corners; mandible with two teeth, the lower tooth not impressed and basad of the upper tooth by only about 1.3 the basal width of upper tooth; maxilla and labrum short; temple moderately wide and weakly convex; occipital carina moderately close to foramen magnum, complete; prepectal carina ending a little dorsad of sternaulus; second recurrent vein with two bullae; hind femur about 4.0 as long as wide; tarsal claws apparently simple; first tergite in profile with a flat dorsal face and slightly concave anterodorsal face, the two faces meeting in a distinct hump; male clasper convex, without a lateral ridge. This subgenus occurs in the western Palaearctic, whence Clément (1930, Konowia, vol. 8, pp. 335–346) has recorded seven species.

Ichneumon micratorius Fabricius, the genotype of *Clêmontia*, has usually been determined as a species of the subgenus *Tylopius*. We have studied the type in Fabricius' collection (Kiel) and find that it is not *micratorius* of authors but the same as *Metopius* (*Peltocarus*) *dentatus* Fabricius as interpreted by Clément (1930, Konowia, vol. 8, p. 340).

2. Subgenus Metopius

Figure 167,a

Metopius Panzer, 1806, Kritische Revision der Insektenfaune Deutschlands. . . , vol. 2, p. 78. Type: *Sphex vespoides* Scopoli; designated by Viereck, 1912.

Peltastes Illiger, 1807, *in* Rossi, Fauna Etrusca, ed. 2, vol. 2, p. 55. Typ : (*Ichneumon necatorius* Fabricius) = *vespoides* (Scopoli); designated by Curt 1824.

Peltopius Clément, 1930, Konowia, vol. 8, p. 347. Type: (*Sphex*) *Metopius vespoides* (Scopoli); original designation.

Facial shield escutcheon-shaped, its upper edge arcuate, its basal point present or absent, sometimes acuminate; interantennal process compressed and forming or surmounted by a median longitudinal ridge, except in a few non-Nearctic species in which the interantennal process is in the form of a short broad triangle without a median ridge; interantennal process continuous dorsally with a sharply compressed tubercle in middle of frons, or separated from this tubercle so that the tubercle forms an independant horn; clypeus broad, its margin almost straight, distinctly reflexed and elevated away from base of labrum; lower tooth of mandible absent or present, when present not or weakly impressed, basad of the apex of upper tooth by at least 1.5 basal width of upper tooth; galea and glossa short; temple convex to flat; occipital carina very close to or distant from foramen magnum, extending ventrally to below center of foramen magnum and often complete to the hypostomal carina; prepectal carina, if complete above, angled strongly forward just above sternaulus almost to reach front edge of mesopleurum, then paralleling front edge of mesopleurum to near subtegular ridge; second recurrent vein with one bulla; hind femur about three times as long as deep; tarsal claws on front and middle tarsi apparently simple, or pectinate on basal 0.3; first tergite in profile various, weakly rounded to pyramidally elevated with a straight dorsal face and straight or somewhat concave anterodorsal face; male clasper convex, without a lateral ridge.

This subgenus is of almost worldwide distribution. Clément (1930, Konowia, vol. 8, pp. 347–365) treats nine Palaearctic species under the subgeneric name *Peltopius;* and *Metopius* (*Metopius*) *velutinus* Clément, 1929, also appears to be correctly placed in the subgenus *Metopius*. *Metopius rufus* Cameron, 1905, and *Metopius browni* Ashmead, 1906, are representatives of a distinct Indo-Australian species group which we consider a part of the subgenus *Metopius*. *Metopius femoratus* Cresson, 1874, from Mexico also belongs in this subgenus. We have two unidentified species of the subgenus from Africa, and there are six Nearctic species, as treated below.

All the Nearctic species have certain characters in common which are enumerated here to escape the need to cite them under the individual species. Facial shield ventrally rounded or subtruncate; temple moderately convex; occipital carina moderately close to foramen magnum, complete below; prepectal carina complete above; flagellum of moderate thickness, its wider segments about 1.7 as wide as long.

Key to the Nearctic species of the subgenus Metopius

1. Lower tooth of mandible present as a distinct, though small projection . . 2
   Lower tooth of mandible absent 4
2. First tergite in side view pyramidal above, the tergite about 1.2 as long as high; front wing 11 to 14 mm. long . . . . **1. robustus** Cresson
   First tergite in side view rounded above, the tergite about 1.35 to 1.6 as long as high; front wing 6 to 11 mm. long 3
3. Third tergite about 0.90 as long as wide; punctures on meso- and metapleura moderately coarse; apicolateral angles of tergites a little less dintinct; front wing 7 to 11 mm. long . . . . **2. mimicus,** new species
   Third tergite about 0.75 as long as wide; punctures on meso- and metapleura very coarse; apicolateral angles of tergites a little more distinct; front wing 6 to 8 mm. long . . . . **3. krombeini,** new species
4. Yellow on second to fourth tergites medially narrow, sublaterally extending forward almost to reach front margin of tergite (fig. 184,b)
   5. galbaneus, new species
   Yellow on second to fourth tergites of rather even width, wide, narrow, or sometimes absent from second tergite, but not narrow medially and almost reaching front margin sublaterally (figs. 183,g,h; 184,a,c) 5

5. Yellow markings occupying narrow apical margin of second tergite (or sometimes lacking from this tergite), broader apical margin of third tergite, and all but base of fourth tergite (figs. 183,g,h, 184,a); first tergite about 0.78 as long as wide . . . . 4. **pulchellus** Cresson
   Yellow markings occupying apical 0.4± of second to fourth tergites (fig. 184,c); first tergite about 0.70 as long as wide . . 6. **vittatus,** new specie

1. Metopius (Metopius) robustus Cresson

Front wing 11 to 14 mm. long; punctures on facial shield moderately large but irregular in size, strong, their interspaces about 0.3 their diameter; lower tooth of mandible small but quite distinct; punctures on mesopleurum coarse, very strong, subadjacent; punctation of metapleurum similar to that of mesopleurum but a little coarser; first tergite about 0.68 as long as wide, in profile pyramidal above, 1.2 as long as high; third tergite about 0.82 as long as wide; seventh tergite of male and sixth tergite of female with a blunt median apical angle which is strongly raised.

This is the largest Nearctic species of the subgenus and it has the most strongly raised first tergite. There are three subspecies, distinguishable on color as indicated below.

Key to the subspecies of Metopius robustus

1. Wings blackish; fourth tergite black with apical 0.3 white (fig. 183,c); range: Carolinian fauna . . . . 1c. **robustus robustus** Cresson
   Wings light brown; fourth tergite yellow, black basally (figs. 183,a,b) . . . 2
2. Hind femur black, yellow on apical part and extreme base; second tergite black, yellow at apex (fig. 183,a); range: Nevada and California. 1a. **robustus concinnus** Cresson
   Hind femur ferruginous, yellow on apical part and extreme base; second tergite ferruginous, black at base (fig. 183,b); range: Kansas and Colorado. 1b. **robustus mirandus** Cresson

1a. Metopius (Metopius) robustus concinnus Cresson, new status

FIGURE 183,a

Metopius concinnus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxvii; ♂. Type: ♂, Nevada, (Philadelphia).

Black. Face except for vertical elliptical area in center of facial shield, interantennal process, side of face, scape, pedicel, palpi, stripe next upper margin of pronotum, subtegular ridge, oval area beneath front end of subtegular ridge (often confluent with the yellow on subtegular ridge), small spot on mesopleurum next to middle coxa, spot in hind part of metapleurum, apical half of scutellum, laterobasal part of scutellum, postscutellum, spot at apex of second lateral area of propodeum, apex of coxae, more or less of upper side of hind coxa, trochanters, narrow base and broad apex of femora, tibiae, tarsi, tegula, first tergite except at base, apical 0.25 (more or less) of second tergite, apical 0.3 to 0.6 of third tergite, fourth to seventh tergites except basally, and male genitalia, yellow; flagellum reddish brown, a little darker toward apex; front and top faces of front and middle femora light brown; wings light yellowish brown, the front half of front wing a little darker.

Specimens: ♀, Inverness, Calif., May 28, 1939, E. C. Van Dyke (San Francisco). ♀, Laytonville, Calif., May 30, 1955, E. I. Schlinger (Townes). ♀, Sonoma Co., Calif. (Washington). ♂, Gardnerville, Nev., May 28, 1939, P. C. Ting, M. A. Cazier, J. A. Downes, and T. Aitken (Townes). ♂ (type), Nevada (Philadelphia).

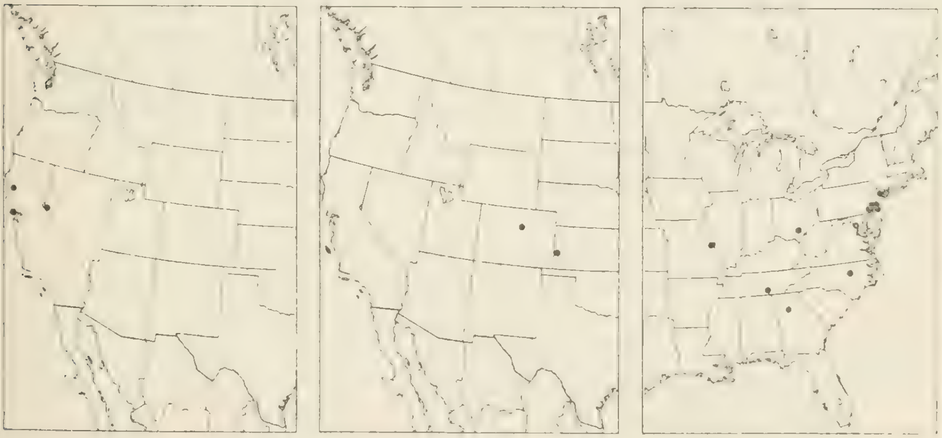
1b. Metopius (Metopius) robustus mirandus Cresson, new status

FIGURE 183,b

Metopius mirandus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxix; ♀. Type: ♀, Colorado (Philadelphia).

Metopius grandior Viereck, 1905, Trans. Kansas Acad. Sci., vol. 19, p. 314; ♀ (new synonymy). Type: ♀, Hamilton Co., Kans., 3,350 ft. (Lawrence).

Male: Black. Face, interantennal process, side of frons, scape, pedicel, more or less of cheek, more or less of basal margin of labrum, sometimes spot on base of mandible, stripe along upper margin of pronotum, small area on subtegular ridge, apical 0.35 and laterobasal part of scutellum, postscutellum, very small spot on mesopleurum next to middle coxa, larger spot on hind part of metapleurum, spot at apex of second lateral area of propodeum, coxae except basally, trochanters, narrow base and broader apex of femora, most of outer face of hind femur, first tergite except at extreme base, narrow apex of second tergite and broader apex of third tergite, fourth to seventh tergites except basally and in laterobasal grooves, and genitalia, yellow; clypeus brownish; flagellum pale reddish brown, darker brown beyond



FIGURES 39–41.—Localities, subspecies of *Metopius* (*Metopius*) *robustus*: 39 (left), *concinnus*; 40 (center), *mirandus*; 41 (right), *robustus*.

the middle; palpi yellowish fulvous; thorax rufous except where described as yellow, and black as follows: median stripe on mesoscutum (broadened anteriorly and abbreviated posteriorly), propleurum laterally, posteroventral part of pronotum, prepectus except above, mesosternum except next to sternaulus, lower and hind parts of mesopleurum, front third and lateral faces of scutellum, front part of metapleurum except for an area in upper front corner, hind margin of metapleurum, and base of propodeum; tegula rufous; legs fulvous (except where described as yellow), the front and middle tibiae and tarsi largely yellowish and hind face of hind femur brownish; wings pale brown, the front half of front wing darker brown; second and third tergites rufous, basally black and apically yellow.

Female: Black. Face except for median vertical elliptical area, interantennal process, side of frons, scape, spot on subtegular ridge, apical 0.35 of scutellum, spot on laterobasal part of scutellum, postscutellum, central area of metapleurum, indistinct small spot at apex of second lateral area of propodeum, apex of coxae, upper side of hind coxa, most of middle and hind trochanters, apex and extreme base of femora, tinge at base of tibiae, first tergite except basally, small apical lateral and apical median spots on third tergite, and tergites four to six except for their basal 0.3 and basolateral area, yellow; scape and flagellum red-brown, the flagellum darker beyond the middle; palpi, upper part of pronotum, tegula, upper anterior part of mesopleurum, lateral margin of mesoscutum, a median pair of narrow stripes on hind part of mesoscutum (these are united by a cross bar in front of scutellum), lateroapical part of propodeum, base of first tergite, apical 0.7 of second tergite, and apical 0.65 of third tergite except for its apical yellow spots, rufous; legs ferruginous except where described as yellow, the hind coxa black basally behind, the hind femur black behind, and the hind tibia infuscate at apex; wings pale brown, the front half of front wing darker brown.

Specimens: ♀, Denver, Colo., June 11, 1948, H., M., G., and D. Townes (Townes). ♀ (type of *mirandus*), Colorado (Philadelphia). ♂, Colorado (Washington). ♀ (type of *grandior*), Hamilton Co. at 3,350 ft., Kans., June 1902, F. H. Snow (Lawrence).

1c. Metopius (Metopius) robustus robustus Cresson

FIGURE 183,c

Metopius robustus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxvii; ♀. Type: ♀, Maryland (Philadelphia).

Metopius harbecki Skinner, 1906, Ent. News, vol. 17, p. 150; [♂] (new synonymy). Type: ♂, Germantown, Philadelphia, Pa. (Philadelphia).

Black. Face except for median vertical elliptical area, interantennal process, basolateral part of frons, sometimes narrow stripe along upper margin of pronotum, scutellum except for more or less of its median basal part, postscutellum, sometimes spot on subtegular ridge, rarely a spot on mesopleurum beneath front end of subtegular ridge, sometimes small spots on meso- and metapleura next to middle coxa, sometimes median spot or area on metapleurum, sometimes spot at apex of second lateral area of propodeum, sometimes apex of front trochanter of male, apex of middle trochanter of male, apex of middle coxa, apex and more or less of upper front part of hind coxa, hind trochanters, very small spot on apex of middle femur in front, spot at apex of hind femur in front, first tergite except at base, rarely apex of second tergite, apical 0.1 to 0.3 of third tergite, and apical 0.2 to 0.3 of fourth tergite, white; wings blackish, the front half of front wing a little darker; male genitalia pale brown.

The type of *M. robustus* is very extensively marked with white. A female from Sewanee, Tenn., has the white markings almost as extensive as in the type of *M. robustus.* The rest of the specimens have less white and correspond rather closely with the type of *M. harbecki.*

Specimens: ♂, Washington, D. C., June 24, 1943, M. Vogel (Townes). ♂, D. C., June 27, 1920, J. C. Bridwell (Washington). ♂, Washington, D. C., September 29, F. Knab (Washington). ♀, Atlanta, Ga., Oct. 3, 1942, V. Nabokov (Cambridge). ♀ (type of *robustus*), Maryland (Philadelphia). ♀, Overland, Mo., Aug. 2, 1934, B. H. Pickel (Townes). ♂, New Rochelle, N. Y., July 10, 1935, M. A. Cazier (New York). ♀, Green Village, N. J., Dec. 2, 1930, Chas. Rummel (Washington). ♀, Moorestown, N. J., June 27, 1939, H. and M. Townes (Townes). ♀, Passaic Junction, N. J., Sept. 29, 1935, M. A. Cazier (New York). ♀, Raleigh, N. C., early October 1917, J. E. Eckert (Washington). ♂, Zaleski, Ohio, June 16, 1939, R. C. Barnes (St. Paul). ♂, Gladwyn, Pa., June 27, 1934, M. A. Cazier (New York). ♂ (type of *harbecki*), Germantown, Philadelphia, Pa., Sept. 25, 1904, H. S. Harbeck (Philadelphia). ♀, Kennett Square, Pa., July 7, 1917, J. Prim (Washington). ♂, Swarthmore, Pa., Aug. 28, 1905 (Philadelphia). ♀, Sewanee, Tenn., Aug. 22, 1929, A. G. Richards (Ithaca). ♀, "Veitch," Virginia, June 11, 1919, L. A. Stearns (Cambridge). According to our field notes, the specimen from Moorestown, N. J., appeared in flight like a slender *Monobia quadridens* (Vespidae) except for having a white band at the tip of the abdomen.

This subspecies occurs in the Carolinian fauna. Adults have been collected from June 11 to early October, and there is one record for December 2.

2. Metopius (Metopius) mimicus, new species

Figures 167,a; 183,d

Front wing 7 to 11 mm. long; punctures on facial shield rather small, of irregular size, and strong, their interspaces about 0.5 their diameters; lower tooth of mandible present as a small separated projection; punctures on mesopleurum rather small, strong, their interspaces about 0.6 their diameters; punctures on metapleurum moderately coarse, strong, subadjacent; first tergite about 0.70 as long as wide, in profile strongly rounded above, about 1.55 as long as high; third tergite about 0.90 as long as wide; seventh tergite of male and sixth tergite of female with a blunt median apical angle which is moderately raised.

Black. Face except for a median vertically elliptical area, interantennal process, side of frons, scape beneath, palpi, small tinge on upper margin of pronotum, spot on subtegular ridge, apical 0.2 to 0.3 and extreme basolateral corner of scutellum, postscutellum, usually apex of coxae, most of trochanters, extreme base and broader apex of femora, most of front and upper sides of fore and middle tibiae, most of hind tibia, most of apical 0.7 of first tergite, apicolateral corners of second tergite, apical 0.3 of third tergite, fourth to seventh tergites except base and basolateral grooves of fourth and fifth tergites, and male genitalia, yellow; antenna fulvous, shaded to blackish beyond basal third; median elliptical mark on facial shield black to fulvous; upper margin of pronotum, upper anterior part of mesopleurum, tegula, longitudinal stripe below sternaulus, spot on metapleurum, often a pair of longitudinal stripes or a median apical spot on mesoscutum, more or less of scutellum, spot at apex of second lateral area of propodeum, areas or tinges on first tergite, apical 0.65 to 0.75 of second tergite (except for yellow apical spots), and third tergite from basal 0.3± to apical 0.3±, rufous; front and middle legs fulvous except where described as yellow; hind coxa apically and above largely ferruginous; hind femur ferruginous except where described as yellow, and blackish on hind side; hind tibia fulvous and yellowish, infuscate apically on hind side; hind tarsus pale brown; wings light yellowish brown, the front half of front wing darker brown.

Type: ♀, near YMCA Camp, Workman Creek, Sierra Ancha, Ariz., May 8, 1947, H. and M. Townes (Washington, USNM 63613).

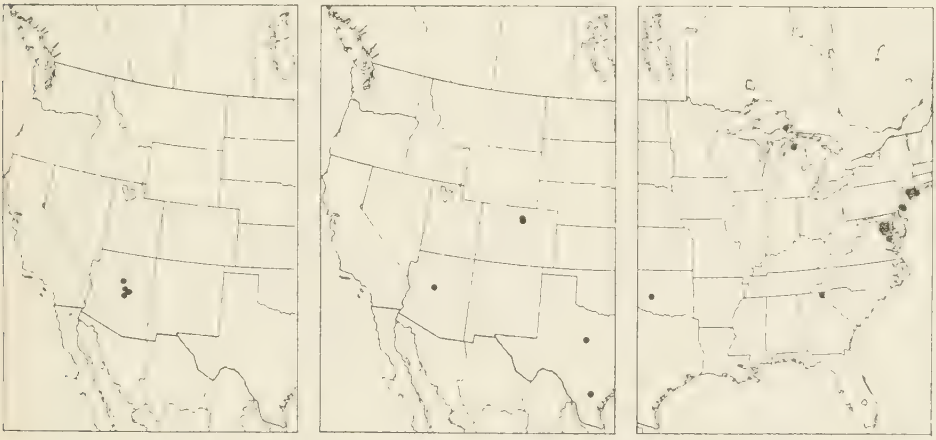
Paratypes: 4♂, 1♀, Oak Creek Canyon, Ariz., May 18, 1947, H. and M. Townes (Townes). 2♂, Pocket Creek, Sierra Ancha, Ariz., May 5, 1947, H. and M. Townes (Townes). 2♂, Sierra Ancha, Ariz., June 16, 1927 (Washington). 90♂, 4♀, near YMCA Camp, Workman Creek, Sierra Ancha, Ariz., April 28 and 30, 1947, and May 6 and 8, 1947, H. and M. Townes (Townes).

The specimens collected at Workman Creek, Sierra Ancha, Ariz., were taken between 9:00 and 11:00 a. m., flying around various shrubs and trees. The females, at least, were a little more frequent around oak, which was leafing out at that time. On the wing this *Metopius* looked almost exactly like a species of *Eumenes* (Vespidae) which was also common at that time and place.

This species has been taken in the Upper Sonoran fauna of Arizona in spring.

3. Metopius (Metopius) krombeini, new species

Front wing 6 to 8 mm. long; punctures on facial shield rather small, strong, of irregular size, their interspaces about 0.5 their diameter; punctures on mesopleurum and on metapleurum coarse, very strong, subadjacent; first tergite about 0.70 as long as wide, in profile very strongly rounded above, about 1.4 as long as high; third tergite about 0.75 as long as wide; apicolateral angles of second tergite a little acute, stronger than in other Nearctic species of the subgenus; seventh tergite of male and sixth tergite of female with a blunt median apical angle that is strongly raised.



FIGURES 42–44.—Localities, species of *Metopius* (*Metopius*): 42 (left), *mimicus;* 43 (center), *krombeini epixanthus;* 44 (right), *krombeini krombeini.*

This is the smallest Nearctic species of the subgenus and is further distinguished by the short abdomen, with coarse, strong punctation. There are two subspecies, as described below:

1. Apical 0.6 to 0.85 of fourth and fifth tergites yellow (fig. 183,e); range: Texas, Colorado, and Arizona . . . . **3a. krombeini epixanthus,** new subspecies
   Apical 0.2 to 0.3 of fourth and fifth tergites yellow (fig. 183,f); range: Alleghenian and Carolinian faunas . . **3b. krombeini krombeini,** new subspecies

3a. Metopius (Metopius) krombeini epixanthus, new subspecies

FIGURE 183,e

Black. Face except for a small median subdorsal spot, interantennal process, side of frons, scape except above, under side of pedicel, palpi, stripe along upper margin of pronotum, subtegular ridge, vertical stripe under front end of subtegular ridge, often a small spot on mesopleurum next to middle coxa, most of metapleurum, apical 0.3 and basolateral part of scutellum, postscutellum, spot at apex of second lateral area of propodeum, front and middle legs except for base of coxae, femora except apically, under side of tibiae toward apex, under side and stripe on top front edge of hind coxa, hind trochanters, apex of hind femur, extreme base of hind tibia, first tergite except basally, apical 0.25 of second tergite, apical 0.35 to 0.8 of third tergite, apical 0.6 to 0.85 of fourth to sixth tergites, apical 0.8 of seventh tergite of male, and male genitalia, yellow; cheek and clypeus black to fulvous or yellow; antenna pale reddish brown basally, shading to dark brown apically; tegula brown; front and middle legs fulvous except where described as yellow; hind coxa and hind femur ferruginous to black except where described as yellow; hind tibia yellowish basally, shading to fuscous or brown apically; hind tarsus brown; wings tinged with brown, the front half of front wing medium brown; thorax and basal three abdominal tergites usually more or less fulvous where not described as yellow, the fulvous area of variable extent.

Type: ♀, Boulder, Colo., June 28, 1933, M. and H. James (Washington, USNM 63614).

Paratypes: ♂, Prescott, Ariz., July 6, 1937, D. J. and J. N. Knull (Townes). ♀, 6 miles north of Boulder, Colo., June 22, 1933 (Townes). ♀, Eastland Co., Tex., May 10, 1921, Grace O. Wiley (St. Paul). ♂, Leon Creek, Bexar Co., Tex., Oct. 11, 1952, B. J. Adelson (Berkeley). The specimen from Leon Creek is somewhat intermediate to the subspecies *krombeini.*

This subspecies has been taken in Colorado, Texas, and Arizona.

3b. Metopius (Metopius) krombeini krombeini, new subspecies

FIGURE 183,f

Black. Face except often for small median subdorsal spot, interantennal process, side of frons, sometimes cheek and lateral corner of clypeus, palpi, narrow stripe along front edge of pronotum, subtegular ridge, usually narrow vertical stripe below front end of subtegular ridge, sometimes small spot on mesopleurum near middle coxa, large area on metapleurum, apex and basolateral corner of scutellum, spot on postscutellum, spot at apex of second lateral area of propodeum, apex of front and middle coxae, front and middle trochanters, apex and extreme base of front and middle femora, base and dorsobasal half of front and middle tibiae, apical spot on hind coxa beneath, hind trochanters except for base of hind first trochanter, extreme base of hind femur and of hind tibia, apex of hind femur, apical 0.65 to 0.75 of first tergite, lateroapical corner of second tergite, apical 0.25± of third and fourth tergites, apical 0.2 of fifth tergite, apical margin of sixth tergite of male, and most of male genitalia, yellow; antenna light brown basally, shading to blackish toward middle, blackish beyond middle; front and middle legs fulvous, or their coxae and femora fulvous to blackish, except where described as yellow; hind coxa ferruginous to blackish except for its apical yellow spot; hind tibia and tarsus brown to black; wings tinged with brown, the front half of front wing medium brown.

Type: ♀, Takoma Park, Md., July 11, 1942, H. and M. Townes (Washington, USNM 63615).

Paratypes: 22♂, 10♀, from Arkansas; Georgia (Tallulah Falls); Maryland (Plummers Island and Takoma Park); Michigan (Douglas Lake and Whitefish Point in Chippewa Co.); New Jersey (Moorestown, Westfield, and Westville); New York (Farmingdale, Roslyn, and Sea Cliff); Oklahoma (Chickasha); Virginia (Dunn Loring and Westmoreland State Park in Westmoreland Co.); and Wisconsin ("Cranmoor").

Males have been taken from June 15 to July 17 and females from June 20 to July 22, with a single female in "August" from Douglas Lake, Mich. This seasonal distribution indicates a single generation per year. We ourselves have collected the subspecies on 10 different dates, always among sunlit scrubby oaks. The species in flight looks like a slender *Ancistrocerus* or similar small eumenine wasp. One of our specimens was collected resting under a leaf of *Rhus toxicodendron*. A male, collected at Takoma Park, Md., on July 2, 1944, was found in woods, flying about foliage in the manner of a male *Exochus*, about three meters from the ground.

This subspecies occurs among sunlit scrubby oaks in the Carolinian fauna. It is on the wing from mid-June to late July. The name is in honor of K. V. Krombein, who collected a number of the paratypes.

4. Metopius (Metopius) pulchellus Cresson

Front wing 9 to 11 mm. long; lower tooth of mandible lacking entirely; punctures on facial shield rather small, strong, and of irregular size, their interspaces about 0.4 their diameters; punctures on mesopleurum coarse, very strong, subadjacent; punctation of metapleurum similar to that of mesopleurum but a little coarser; first tergite about 0.78 as long as wide, in profile strongly rounded above, about 1.45 as long as high; third tergite about 0.83 as long as wide; seventh tergite of male and sixth tergite of female with a blunt median apical angle which is moderately raised.

This is a species of Wyoming, Colorado, New Mexico, and Arizona, with three subspecies differentiated by the amount of ferruginous in the ground color.

Key to the subspecies of Metopius pulchellus

1. Thorax ferruginous and yellow, range: Colorado and Wyoming.
   4c. pulchellus pulchellus Cresson
   Thorax black and yellow, sometimes with a little ferruginous 2
2. Apical 0.25± of third tergite yellow (fig. 183,g), range: Utah and Arizona.
   4a. pulchellus montanus Cresson
   Apical 0.5± of third tergite yellow (fig. 183,h), range: New Mexico and Arizona . . . . **4b. pulchellus sonora,** new subspecie

4a. Metopius (Metopius) pulchellus montanus Cresson, new status

FIGURE 183,g

Metopius montanus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc p. xxviii; ♂. Type: ♂, Colorado (Philadelphia).

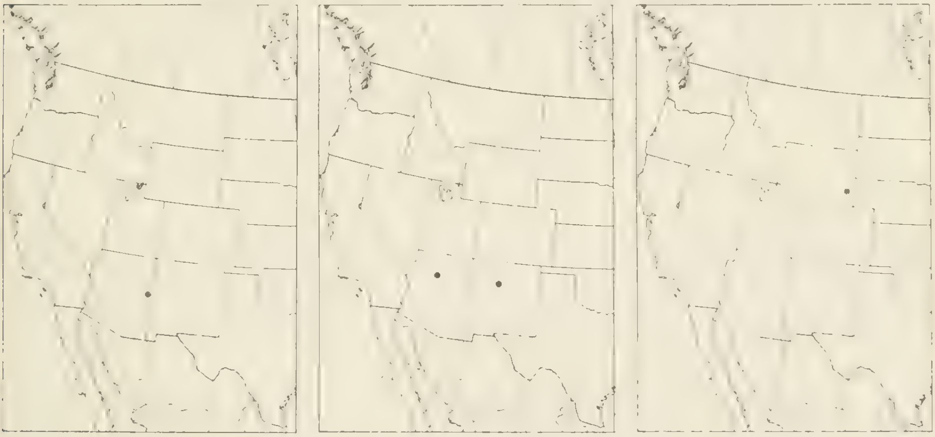
Black. Face except for a large (male) or small (female) median vertical elliptical spot, interantennal process, lower lateral part of frons, front of scape, palpi, narrow stripe along upper margin of pronotum (this stripe sometimes ferruginous), subtegular ridge, usually a vertical oval spot beneath front end of subtegular ridge, sometimes most of tegula, sometimes small spot on mesopleurum next to middle coxa, usually a large spot on metapleurum, apex and basolateral corner of scutellum, postscutellum, spot at apex of second lateral area of propodeum, apex of coxae, trochanters except on under side of front and middle trochanters and base of hind first trochanter, apex and extreme base of femora, more or less of front side of fore and middle femora, upper part of front and middle tibiae, more or less of hind tibia basally, dorsally, and on front side, apical 0.7 of first tergite, lateroapical corner of second tergite, apical 0.2 of third tergite, fourth to seventh tergites except basally, and male genitalia, yellow; antenna reddish brown basally; front and middle legs blackish to fulvous except where described as yellow, beyond their femora only fulvous and yellow; hind coxa sometimes partly fulvous; hind tibia and tarsus brown except as described yellow; tegula brown, with or without a yellow spot; wings tinged with brown, the front half of front wing medium brown.

Specimens: ♂, ♀, near Alpine, Ariz., May 29, 1947, H. and M. Townes (Townes). ♂ (type), Colorado (Philadelphia). ♀, Logan Canyon, Utah, July 24, 1906 (Ithaca).

4b. Metopius (Metopius) pulchellus sonora, new subspecies

FIGURE 183,h

Black. Face except for subdorsal small spot or median vertical oval area, interantennal process, side of frons, under side of scape and pedicel, sometimes part of clypeus and mandible, palpi, narrow stripe along upper margin of pronotum, subtegular ridge, vertical oval spot spot below front end of subtegular ridge (sometimes connected with mark on subtegular ridge), longitudinal stripe on mesosternum next to sternaulus or a small spot on mesopleurum near middle coxa, most of metapleurum, apical 0.3 of scutellum and its basolateral corner, postscutellum, coxae apically, trochanters except under side of front and middle trochanters and base of hind first trochanter, apex and extreme base of femora, sometimes apical half of hind femur in front, most of front side of fore and middle femora, upper part of front and middle tibiae, base (or base, upper, and front parts of hind tibia except towards apex), basal 0.7 of first tergite, apicolateral spot on second tergite, apical 0.5± of third tergite, fourth and following tergites except at base, and male genitalia, yellow; antenna reddish brown basally; front and middle legs fulvous except where described as yellow; hind coxa blackish basally behind, the rest ferruginous with the apex more or less yellow; hind femur blackish behind, elsewhere blackish to ferruginous except where described as yellow; hind tibia ferruginous, except where described as yellow, infuscate apically, especially on inner side; hind tarsus brown; second tergite rufous, black at base and with a lateroapical yellow spot; third tergite with a rufous tinge between its black base and yellow apex; tegula ferruginous, with or without a yellow spot; propleurum medially, and areas surrounding some of yellow markings on thorax, especially on



FIGURES 45–47.—Localities, subspecies of *Metopius* (*Metopius*) *pulchellus:* 45 (left), *montanus;* 46 (center), *sonora;* 47 (right), *pulchellus.*

mesopleurum, ferruginous; wings tinged with brown, the front half of front wing medium brown.

Type: ♀, Williams, Ariz., May 28, Barber and Schwarz (Washington, USNM 63616).

Paratype: ♂, campus of University of New Mexico, Albuquerque, N. Mex., May 12, 1950, "C. C. H." (Dreisbach).

4c. Metopius (Metopius) pulchellus pulchellus Cresson

FIGURE 184,a

Metopius pulchellus Cresson, 1865, Proc. Ent. Soc. Philadelphia, vol. 4, p. 271; ♀. Type: ♀, Colorado (Philadelphia).

Similar to the subspecies *M. pulchellus sonora* except that the ground color is ferruginous rather than black. Black occurs only on the occiput (sometimes), as a median anterior spot on mesoscutum, on base of third and following tergites, and as infuscation on upper hind part of mesopleurum, in sternaulus, and in areas near the scutellum.

Specimens: ♀, "Clear Creek," Colo., May 22 (Washington). ♀, Colorado, C. F. Baker (Townes). ♀ (type), Colorado (Philadelphia). ♀, Wheatland, Wyo., July 14, 1937, H. T. Peters (Lawrence). ♂, "on *Populus*," T. D. A. Cockerell (Washington). ♀, no locality, collected by Belfrage (Washington). 2♀, no data (Washington).

5. Metopius (Metopius) galbaneus, new species

FIGURE 184,b

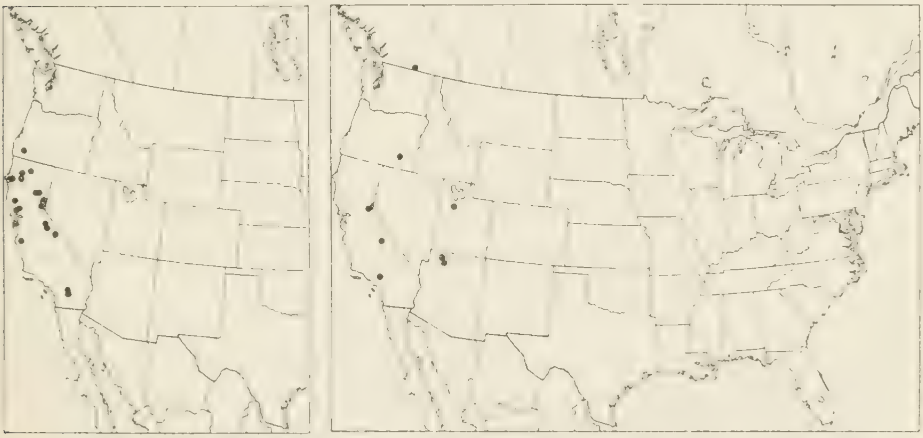
Front wing 9 to 10.5 mm. long; lower tooth of mandible lacking entirely; punctures of facial shield small, sharp, and of irregular size, their interspaces about 0.5 their diameters; punctures on mesopleurum rather small, strong, their interspaces about 0.5 their diameters; punctures on metapleurum coarse, not sharp, subconfluent with weak coarse wrinkling; first tergite about 0.77 as long as wide, in profile strongly rounded above, about 1.5 as long as high; third tergite about 0.87 as long as wide; seventh tergite of male and sixth tergite of female with a weak, blunt median apical angle which is weakly raised.

Black. Face except for median vertical elliptical area or one or two median spots, interantennal process, side of frons, usually a mark at lateral corner of clypeus, usually scape and pedicel beneath,usually side of labrum, sometimes spot at base of mandible, palpi, stripe along upper margin of pronotum, subtegular ridge, vertical oval area on mesopleurum below front end of subtegular ridge, small spot on mesopleurum near middle coxa or rarely a stripe on mesosternum next to sternaulaus, large spot on metapleurum, usually part or all of tegula, apical half of scutellum, sometimes laterobasal corner of scutellum, postscutellum, spot at apex of second lateral area of propodeum, apical 0.2 to 0.8 of front and middle coxae, usually apical ventral and dorsal spots on hind coxa, trochanters except for base of first hind trochanter, usually front of front femur, sometimes front of middle femur, base and broader apex of all femora, front and middle tibiae and tarsi, hind tibia except for hind face which is brown (broader apically) and usually a brown subapical mark on front face, apical 0.8 of first tergite, second and following tergites apically and laterally, and male genitalia, yellow; flagellum basally brown beneath; hind tarsus light brown, the basitarsus largely yellowish; wings tinged with brown, the front half of front wing darker. The yellow on abdominal tergites 2 to 7 includes the apical 0.2 to 0.45 and the sides (narrowly to broadly) except for the basal lateral oblique impressions, which are black. The basocentral black area on the tergites varies from a rectangular shape with somewhat concave sides (usually in males) to a U-shaped or V-shaped area, in all cases making a pattern unique among the Nearctic species of *Metopius*, but somewhat like that in *M. errantius californicus*.

A single male from Indian Flat, Mariposa Co., Calif., has the yellow markings unusually extensive, including all of the front and middle legs except for the extreme base of coxae and entire front face of hind femur.

Type: ♀, 4 miles west of Quincy, Calif., June 22, 1949, A. S. Deal (Washington, USNM 63617).

Paratypes: 12♂, 21♀, from California (Arroyo Seco Camp in Monterey Co., Blocksburg, Carrville at 2,400 to 2,500 ft., Comanche Creek Canyon in Yolo Co., Dunsmuir, Fort Seward, Herkey Creek in the San Jacinto Mts., Indian Flat in Mariposa Co., Keen Camp in the San Jacinto Mts., Lower Lake in Lake Co., 4 miles west of Quincy, Samuel Spring in Napa Co., Sierraville, near Stanford



FIGURES 48, 49.—Localities: 48 (left), *Metopius* (*Metopius*) *galbaneus*; 49 (right), *M.* (*M.*) *vittatus*.

University, Tallac at Lake Tahoe, Tanbark Flat in Mariposa Co., Weaverville, and 3 miles west of Westgard Pass in Inyo Co.) and Oregon (Kane Creek 5 miles west of Gold Hill at 2,000 ft.).

Collecting dates are from May 10 to July 4.

There are two flower records: on *Astragalus* 3 miles west of Westgard Pass, Inyo County, Calif.; and on *Eriodictyon* at Keen Camp in the San Jacinto Mts., Calif.

This species is in the Upper Sonoran fauna of California and Oregon. Adults occur in early summer.

6. Metopius (Metopius) vittatus, new species

FIGURE 184,c

Front wing 8.3 to 9 mm. long; upper edge of facial shield somewhat protuberant so that the facial shield is distinctly concave in profile (facial shield less concave or flat in other Nearctic species of the subgenus); punctures on facial shield small, sharp, and of irregular size, their interspaces about 0.3 their diameters; lower tooth of mandible lacking entirely; punctures on mesopleurum rather small, sharp, their interspaces about 0.5 their diameter; punctures on metapleurum rather coarse, moderately sharp, their interspaces about 0.4 their diameters; first tergite about 0.70 as long as wide, in profile very strongly rounded, about 1.35 as long as high; third tergite about 0.73 as long as wide; seventh tergite of male and sixth tergite of female with a weak, blunt, median apical angle which is weakly raised.

Black. Face except for median vertical elliptical area or sometimes a small median spot, interantennal process, side of frons, scape beneath, often pedicel beneath, often part of free margin of labrum, palpi, stripe along upper margin of pronotum, usually part and sometimes all of tegula, subtegular ridge, vertical elliptical to rectangular spot beneath subtegular ridge, small spot on mesopleurum near middle coxa, sometimes stripe on mesosternum next sternaulus, large area on metapleurum, apical half of scutellum and its basolateral corners, postscutellum, spot at apex of second lateral area of propodeum, apical 0.2 to 0.8 of front and middle coxae, apical spot on hind coxa beneath, trochanters except for hind basal part of first hind trochanter, narrow base and broad apex of femora, usually more or less of front and middle femora in front, front and middle tibiae and tarsi, hind tibia except for brown mark behind (broadened apically), all but base of first tergite, apical 0.25 to 0.75 of second and following tergites, and male genitalia, yellow; flagellum basally brown beneath; wings tinged with brown, the front half of front wing darker.

Type: ♀, 10 miles west of Jacob Lake, Ariz., June 6, 1946, R. M. Bohart (Washington, USNM 63618).

Paratypes: 3♂, Grand Canyon at 7,000 ft., Ariz., June 5, 1940, R. M. Bohart (Townes). ♂, ♀, same data as type (Townes). ♀, Osoyoos, B. C., May 28, 1938, G. S. Walley (Ottawa). ♂, Lone Pine, Calif., June 14, 1937, N. W. Frazier (Berkeley). ♀, 5 miles south of Meyers, Calif., July 24, 1955, J. C. Downey (Davis). ♂, Valyermo, Calif., Apr. 21, 1940, R. M. Bohart (Townes). ♂, Frenchglen, Oreg., July 6, 1935, Stanley Jewett, Jr. (Townes). ♀, Vernon, Utah, June 8, 1943, G. F. Knowlton and P. E. Telford (Berkeley).

This species ranges from British Columbia to northern Arizona. Adults occur in early summer.

3. Subgenus Cultrarius

FIGURES 168,a,b

Cultrarius Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 197. Type: *Metopius rileyi* Marlatt; monobasic.

Facial shield escutcheon-shaped, its upper edge arcuate, its lower side usually broadly rounded and without a basal point; disc of facial shield sometimes with a longitudinal carina; interantennal process compressed and forming or surmounted by a median longitudinal ridge, continuous dorsally with a sharply compressed tubercle in middle of frons; clypeus broad, its margin almost straight, distinctly reflexed and elevated away from base of labrum; lower tooth of mandible entirely absent; galea and glossa often elongate (anthophilous); temple strongly convex; occipital carina rather distant from foramen magnum, strong above but fading out just above level of center of foramen magnum; prepectal carina, if complete above, angled strongly forward just above sternaulus almost to reach front edge of mesopleurum, then paralleling front edge of mesopleurum to near subtegular ridge; second recurrent vein with one bulla, or rarely with two; hind femur about three times as long as deep; claws on front and middle tarsi pectinate on their basal 0.3 to 0.65, or pectinate throughout; first tergite in profile low, rounded or weakly angled at the juncture of its dorsal and basodorsal faces; male clasper convex, without a lateral ridge.

All the known species of this subgenus are Nearctic.

Key to the species of the subgenus Cultrarius

1. Claws of front and middle tarsi pectinate to the apical point; galea short, not projecting; spring and early summer species 2
   Claws of front and middle tarsi pectinate on their basal 0.25 to 0.7, not pectinate to the apical point; galea elongate (0.6 to 1.0 as long as mandible), projecting; autumnal species 4
2. Facial shield with a median longitudinal carina; mesoscutum with an anterolateral yellow spot . . . . **3. scapulatus,** new species
   Facial shield without a median longitudinal carina; mesoscutum entirely black . 3

3. Hind tibia brownish ferruginous, paler basally; facial shield very broadly rounded below, without a trace of a basal point . . **1. comptus** Cresson

Hind tibia bright yellow, its apical 0.35 blackish; facial shield narrowly rounded and a little pointed below . . . . **2. scitulus** Cresson

4. Facial shield without a median longitudinal carina (fig. 168,b) 5

Facial shield with a median longitudinal carina (fig. 168a) 8

5. Claws of front and middle tarsi pectinate on their basal 0.65; glossa not protruding beyond galea; hind femur about 3.2 as long as deep. **4. xanthostigma** Ashmead

Claws of front and middle tarsi pectinate on their basal 0.3 to 0.4; glossa protruding beyond galea; hind femur about 2.7 as long as deep 6

6. Prepectal carina complete, extending dorsally to near subtegular ridge; dorsobasal face of first abdominal tergite normal, about 0.7 to 1.0 as long as dorsal face; ovipositor about 1.4 as long as apical depth of abdomen. **5. consector,** new species

Prepectal carina incomplete, extending dorsally to just above sternaulus; dorsobasal face of first abdominal segment extending most of the length of the segment, the dorsal face obliterated or only about 0.3 as long as basal face (fig. 168,b); ovipositor about 1.8 to 3.5 as long as apical depth of abdomen 7

7. Apicolateral corner of scutellum weakly produced, rather blunt; second tergite black, with the apicolateral corners yellow (fig. 185,b); upper margin of pronotum with a yellow stripe; ovipositor about 1.8 as long as apical depth of abdomen . . . . **10. secundus,** new species

Apicolateral corner of scutellum distinctly produced (though not so strongly as in most other species of the genus), acute; second tergite black, with the apical margin yellow; upper margin of pronotum without a yellow stripe; ovipositor about 3.5 as long as apical depth of abdomen. **11. rileyi** Marlatt

8. Metapleurum almost impunctate; mesopleurum with a large yellowish spot. **9. birkmani** Brues

Metapleurum with coarse, scattered punctures; mesopleurum entirely black or with rather small yellow spot just below the wing 9

9. Second tergite with its apical 0.5 yellow; galea about 1.7 as long as wide; prepectal carina weak above . . . . **6. rufipes** Cresson

Second tergite with its apicolateral corners white (fig. 184,h); galea about 2.2 as long as wide; prepectal carina strong above 10

10. Facial shield about 1.6 as high as wide, its median carina rather indistinct; subtegular ridge yellow; mesosternum with a yellow stripe next to sternaulus . . . . **7. pectoralis,** new species

Facial shield about 1.3 as high as wide, its median carina strong and sharp; subtegular ridge and mesosternum entirely black . . **8. ultimatus** Davis

1. Metopius (Cultrarius) comptus Cresson, new combination

Figure 184,d

Metopius comptus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxviii; ♀. Type: ♀, Colorado (Philadelphia).

Metopius laticinctus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxix; ♀. Type: ♀, Colorado (Philadelphia).

Front wing 8.5 to 9.0 mm. long; facial shield about 1.1 as high as wide, without a median longitudinal carina, with coarse punctures interspersed with smaller punctures, the punctures rather close; wider segments of flagellum about 2.2 as wide as long; galea short, broadly rounded, with moderately dense setae; glossa short, broad; second segment of maxillary palpus pyriform, a little flattened, weakly swollen in male and strongly swollen in female; mesopleurum with very coarse punctures, the interspaces about 0.7 the punctural diameter; metapleurum with very coarse punctures, the interspaces about 0.8 the punctural diameter; prepectal carina complete; areolet about 2.0 as wide as length of second recurrent vein; claws of front and middle tarsi pectinate throughout.

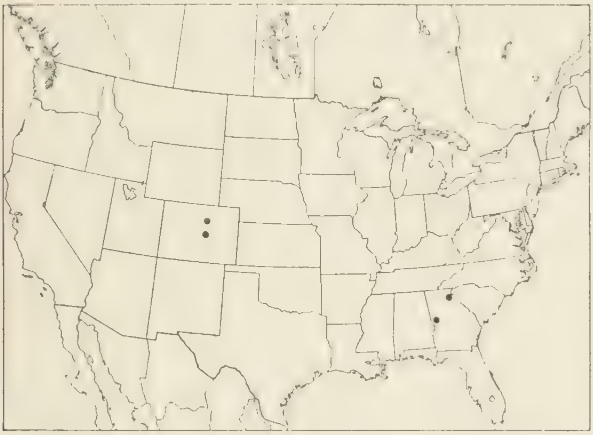


Figure 50.—Localities for *Metopius* (*Cultrarius*) *comptus*.

Black, the pleura, propodeum, legs, and abdomen except apically, more or less piceous or dark ferruginous. Face except for median longitudinal area on facial shield, interantennal process, side of frons, underside of scape, labrum except mediobasally, palpi of male, broad mark along upper edge of pronotum, subtegular ridge and sometimes an adjacent part of mesopleurum below it, often a spot above middle coxa, most of metapleurum, scutellum except basally, spot at apex of area dentipara, apical part of front and middle coxa above and in front, much of hind coxa above, first trochanters except below and basally, second trochanters, extreme bases of femora, apices of front and middle femora, front and middle tibiae and tarsi, large apicolateral spot on first and second tergites (those of the second tergite often connected to form a tranverse band), apical 0.5 to 0.8 of third tergite, apical 0.3 to 0.6 of fourth tergite (extending forward a little sublaterally), apical 0.2 to 0.3 of fifth tergite (widened laterally), apical 0.15 to 0.2 of sixth tergite (usually with a sublateral forward projection), and male genitalia, yellow; female palpi more or less yellowish brown; antenna ferruginous except for yellow on under side of scape, somewhat darker above and apically; legs, especially the front and middle legs, tending towards ferruginous or brownish ferruginous where not colored yellow; wings tinged with brown.

Specimens: ♀, Denver, Colo., June 11, 1948, H., M., G., and D. Townes (Townes). ♀, El Paso Co., Colo., July 7, 1921, Grace O. Wiley (St. Paul). ♂, 3♀ (including types of *comptus* and *laticinctus*), Colorado (Philadelphia). ♀ Hamilton, Ga., May 16, 1936, P. W. Fattig (Washington). ♀, Lula, Ga., May 30, 1937, P. W. Fattig (Washington). ♂, "Clover," S. Dak., June 18, 1929, H. C. Severin (Townes).

This species has been collected in Georgia, South Dakota, and eastern Colorado. Adults occur in late spring and early summer.

2. Metopius (Cultrarius) scitulus Cresson, new combination

Metopius scitulus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxix; ♂. Type: ♂, Nevada (Philadelphia).

Male type: Front wing 7 mm. long; facial shield about 1.16 as high as wide, without a median carina, with coarse punctures interspersed with smaller punctures, the interspaces of the larger punctures about 0.6 their diameter; lower edge of facial shield more sharply rounded than usual for the subgenus; wider segments of flagellum about 2.1 as wide as long; galea short, broadly rounded, with moderately dense setae; glossa short (not visible in the specimen at hand); second segment of maxillary palpus pyriform, a little flattened and weakly swollen; mesopleurum with very coarse punctures, the inserspaces about 1.0 the punctural diameter; metapleurum with very coarse punctures, the interspaces about 1.5 the punctural diameter; prepectal carina complete; areolet about 2.0 as wide as length of second recurrent vein; claws of front and middle tarsi pectinate throughout.

Black. Broad lateral and ventral margins of facial shield, space between facial shield and eye, interantennal process, clypeus except for a mediobasal area, second segment of maxillary palpus, scape and pedicel beneath, broad stripe on upper margin of pronotum, small spot on tegula, vertically rectangular area on mesopleurum below wing, small elongate mark on mesopleurum near middle coxa, most of metapleurum, scutellum except at base, small spot at apex of area dentipara, large apicolateral spot on first tergite, front and middle coxae apically and on apical half in front, apical 0.25 to 0.35 of second through sixth tergites medially and increased to apical 0.6 to 0.8 sublaterally, apical 0.3 of seventh tergite, most of under part of first through fifth abdominal segments, apical 0.2 to 0.3 of sixth and seventh sternites, and genitalia, yellow; legs beyond coxae yellow, marked with blackish as follows: hind femur except on base, apex, and in front; middle femur except on base and apex; front femur except on apex; and hind tibia on its apex, the extent of the blackish apex of hind tibia grading from the apical 0.4 below to the apical 0.12 above; palpi, except for second segment of maxillary palpus, yellowish brown; wings subhyaline, tinged with brown; tarsi, especially the hind tarsus, tinged with brown apically; flagellum fulvous, shaded to fulvous brown apically.

Specimen: ♂ (type), Nevada (Philadelphia).

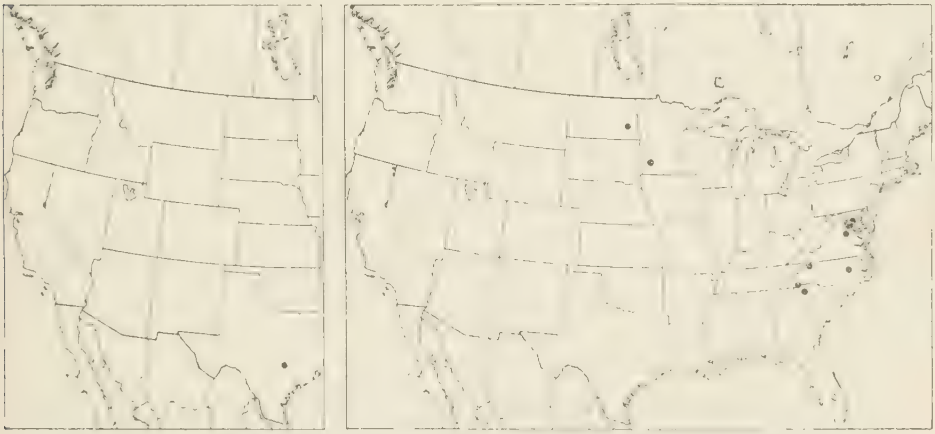
3. Metopius (Cultrarius) scapulatus, new species

FIGURE 184,e

Male type: front wing 9 mm. long; facial shield about 1.0 as high as wide, with a median longitudinal carina; wider segments of flagellum about 2.6 as wide as long; second segment of maxillary palpus about 0.33 as wide as long, not distinctly flattened. Otherwise structurally similar to *M. pectinatus.*

Black, the basal half of abdomen stained with ferruginous and the legs and antenna ferruginous, the hind femur, tibia, and tarsus brownish ferruginous. Face, cheek, clypeus, frons except centrally, interantennal process, scape and pedicel except above, mouth parts except apex and margins of mandible, elongate marginal mark on mesoscutum covering front end of notaulus, broad mark on upper edge of propleurum, subtegular ridge, vertical oval mark on front of mesopleurum below subtegular ridge, small spot above middle coxa, apical 0.65 of metapleurum, tegula except apically, scutellum, basolateral appendage of scutellum, small spot at apex of area dentipara, front and middle coxae, trochanters, and femora, apical part of first trochanter of hind leg, front and middle tarsi and their tibiae except below, apex of hind femur in front and above, irregular apical 0.4 of first tergite, apical 0.7, 0.8, 0.5, 0.35, and 0.3 of tergites two through six, respectively, median apical spot on seventh tergite, and gentalia, yellow; wings tinged with brown. The apical yellow bands on tergites four through six have a small median and sublateral protrusion.

Type: ♂, McDade, Tex., Mar. 28, 1935, J. E. Gillaspy (Washington, USNM 63619).



FIGURES 51, 52.—Localities: 51 (left), *Metopius (Cultrarius) scapulatus;* 52 (right), *M. (C.) xanthostigma.*

4. Metopius (Cultrarius) xanthostigma Ashmead, new combination

FIGURE 184,f

Metopius xanthostigma Ashmead, 1890, Proc. U. S. Nat. Mus., vol. 12, p. 438; ♂. Type: ♂, North Carolina (Washington).

Front wing 9.5 to 12 mm. long; facial shield about 1.33 as high as wide, without a median longitudinal carina, with coarse punctures separated by about 1.3 their diameter and smaller punctures on the interspaces; wider segments of flagellum about 2.0 as wide as long; galea somewhat elongate, with moderately dense setae; glossa short; second segment of maxillary palpus moderately swollen, a little flattened, in male about 4 times as long as wide, in female about 3 times as long as wide; punctures on mesopleurum and metapleurum coarse, those on mesopleurum separated by about 0.7 their diameter, those on metapleurum separated by about their diameter; prepectal carina extending a little above sternaulus; areolet about 2.1 as wide as length of second intercubital vein; claws of front and middle tarsi pectinate on their basal 0.65.

Black. Face except for a median vertical area in female and sometimes in male, sometimes part of cheek in male, side of frons, interantennal process, labrum of male, sides of labrum of female, second segment of maxillary palpus, spot on under side of scape and often of pedicel, wide mark along upper margin of pronotum, broad mark over subtegular ridge and connected with vertical mark on upper front part of mesopleurum, apical 0.7± of scutellum, small mark on basolateral carina of scutellum, small spot above middle coxa, most of metapleurum, small spot at apex of area dentipara, apex of fore and middle coxae above and in front, usually dorsal and anterior apical marks on hind coxa, apical part of first trochanters, second trochanter of hind leg, apex of front and middle femora (on the front of front femur extending basad), front and middle tibiae except for brownish stripe beneath, front and middle tarsi, apex of hind femur, basal 0.4, apex, and upper side of male hind tibia, basal 0.3 and sometimes narrow apex of female hind tibia, hind tarsi more or less, apical 0.33, 0.3, 0.25, 0.2, 0.18, and 0.18 of tergites one through six, respectively, and male genitalia, yellow; palpi and hind tibia brown (where not yellow); wings strongly tinged with brown.

Specimens: ♂, 2♀, Takoma Park, Md., Sept. 29, 1945, Oct. 17, 1942, and Oct. 25, 1944, H. and M. Townes (Townes). ♀, Yellow Medicine Co., Minn., Sept. 15, 1938, C. E. Mickel (St. Paul). ♂, Blowing Rock at 4,000 ft., N. C., Sept. 14, 1921, J. C. Bradley (Ithaca). ♀, Raleigh, N. C., Oct. 2, 1911 (Washington). ♂ (type), North Carolina (Washington). ♂, Valley City, N. Dak., Aug. 28, 1917, P. W. Fattig (Washington). 3♂, 4♀, Cedar Mountain, N. C., Oct. 4, 1941, H. and M. Townes (Townes). 6♀, Greenville, S. C., Oct. 9 and 10, 1941, H. and M. Townes (Townes). ♀, Charlottesville, Va., Oct. 25, 1941, H. Townes (Townes). ♀, Falls Church, Va., October 11, N. Banks (Cambridge). 2♂, 1♀, Glencarlyn, Va., October 4, N. Banks (Cambridge). ♀, University of Richmond, Va., Oct. 25, 1936, C. C. Waiton (Washington).

Our collections have always been in overgrown fields, pastures, or meadows, usually in dry fields containing broomsedge (*Andropogon*) and scattered young pine trees, in mid-fall. The specimens were flying among the tips of the broomsedge, about two feet from the ground.

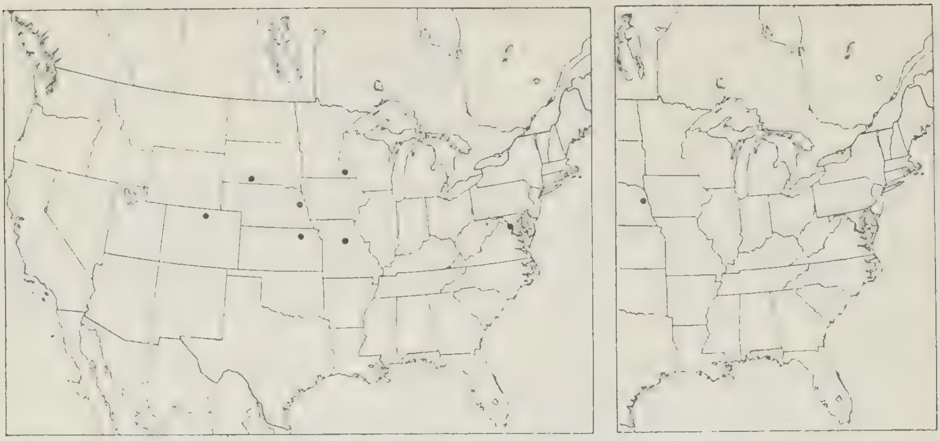
This species is in the Carolinian fauna. Adults occur in fall and seem to be found only in overgrown fields.

5. Metopius (Cultrarius) consector, new species

FIGURE 184,g

Front wing 8 to 9 mm. long; facial shield about 1.3 as high as wide, without a median carina, with coarse punctures of variable size, their spacing varying from adjacent to a separation of 0.33 the punctural diameter; wider segments of flagellum about 2.2 as wide as long; galea and glossa as in *M. ultimatus;* second segment of maxillary palpus of male very little enlarged, about 6.0 as long as wide; second segment of maxillary palpus of female pyriform and a little flattened and asymmetric, about 1.8 as long as wide; punctures on mesopleurum and metapleurum coarse, their interspaces about 0.6 the punctural diameter on mesopleurum and about 1.0 the punctural diameter on metapleurum; prepectal carina complete; claws of front and middle tarsi pectinate on their basal 0.3 to 0.4.

Black, the front and middle legs light brown to ferruginous, the hind leg dark brown. Face except for a medium vertical stripe from near dorsal edge of facial shield to clypeus, interantennal process, side of frons, under side of scape, second segment of maxillary palpus, stripe along upper margin of pronotum, apical 0.5 of scutellum (but usually with a narrow median black line), postscutellum, large spot on metapleurum, moderate sized spot at apex of second lateral area of propodeum, usually apices of coxae, longitudinal mark on upper side of hind coxa, most of trochanters (the rest of trochanters brownish), apices of femora, basal 0.1± of tibiae, apical 0.7 of first tergite, often apicolateral corners of second tergite, often a small median spot on second tergite, apical 0.33 of third tergite, apical 0.25 of fourth tergite, apical 0.2± of fifth tergite, sometimes apical 0.18± of sixth tergite, and apical part of male genitalia, yellow; antenna brown, darker above; front and middle femora fulvous to dark brown; front and middle tibiae and tarsi fulvous, the tibiae sometimes brownish below; hind leg dark brown; wings dark brown, the stigma light brown.



FIGURES 53, 54.—Localities: 53 (left), *Metopius* (*Cultrarius*) *consector;* 54 (right), *M.* (*C.*) *rufipes.*

Type: ♂, Columbia, Mo., Sept. 27, 1938, W. S. Craig (Washington USNM 63620).

Paratypes: ♂, "at sugar," Fort Collins, Colo., Sept 26, 1894, C. F. Baker (Washington) ♀, Riley Co., Kans., Marlatt (Washington). ♂, "Reno, western Kans., Oct. 4, Lautz" (Cambridge). ♂, Olmsted Co., Minn., C. N. Ainslie (Townes). ♀, West Point, Nebr., September 1887 (Philadelphia). ♂, Nebraska (Washington). ♀, Martin, S. Dak., Sept. 15, 1931, H. C. Severin (Townes). ♀, Glencarlyn, Va., Oct. 4, N. Banks (Cambridge).

This species ranges from the Atlantic to Colorado, in the upper Austral zone. Adults occur in fall.

6. Metopius (Cultrarius) rufipes Cresson, new combination

Metopius rufipes Cresson, 1865, Proc. Ent. Soc. Philadelphia, vol. 4, p. 270; ♀. Type: ♀, Colorado (Philadelphia).

Female: Front wing 8.5 to 10.3 mm. long; facial shield about 1.2 as high as wide, with a strong median longitudinal carina, with coarse punctures and scattered smaller punctures on the interspaces, the interspaces about 0.6 the diameter of coarse punctures; wider segments of flagellum about 3.0 as wide as long; galea elongate, not as long as in *M. ultimatus* and many other species of *Cultrarius* but longer than in *M. xanthostigma,* projecting about 0.7 as long as mandible, with rather few setae, these denser apically and along the edges; glossa long, projecting beyond galea but a little shorter and stouter than in *M. ultimatus* and many other species of the subgenus *Cultrarius;* second segment of maxillary palpus swollen, a little flattened, about 2.0 as long as wide; punctures on mesopleurum and metapleurum coarse, those on mesopleurum separated by about 0.7 their diameter, those on metapleurum separated by about 1.5 their diameter; prepectal carina weak above sternaulus, extending halfway dorsad from sternaulus to subtegular ridge; scutellum a little wider and flatter than in *M. ultimatus;* claws of front and middle tarsi pectinate on their basal 0.65±; abdomen basally unusually broad.

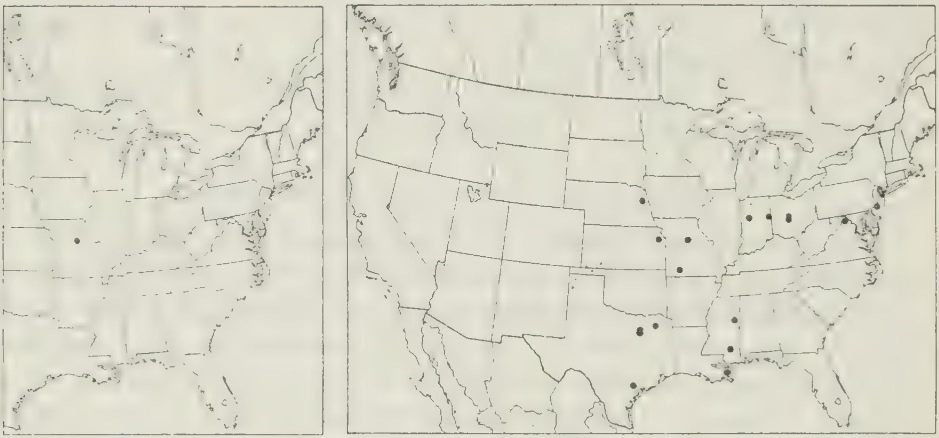
Black, the legs and basal 2 or 3 abdominal segments brownish ferruginous. Face around margins of its shield, interantennal process, side of frons, palpi, wide stripe along upper edge of pronotum, transversely rectangular spot on mesopleurum below wing, scutellum except its basal trough, most of metapleurum, small spot at apex of second lateral area of propodeum, tinge on upper edge of front and middle tibiae, and apical 0.7, 0.5, 0.4, 0.3, 0.25, and 0.2 of abdominal tergites one through six, respectively, yellow; antenna brownish fulvous, the scape and pedicel brown above and flagellum increasingly shaded with brown apically; galea and most of mandible brown; wings tinged with brown, the apical 0.25 of front wing distinctly paler and the stigma yellowish.

Specimens: ♀ (type), Colorado (Philadelphia). ♀, West Point, Nebr., September 1887 (Philadelphia).

7. Metopius (Cultrarius) pectoralis, new species

Male type: Front wing 8 mm. long; facial shield 1.58 as high as wide, with a weak median longitudinal carina, with very coarse somewhat confluent punctures; wider segments of flagellum about 2.1 as wide as long; galea elongate, projecting, about 0.8 as long as mandible, with very few setae except on the edges; glossa narrow, long, projecting beyond the galea; second segment of maxillary palpus swollen, a little flattened, about 2.8 as long as wide; punctures on mesopleurum and metapleurum coarse, those on mesopleurum separated by about 0.4 their diameter, those on metapleurum separated by about 0.7 their diameter; prepectal carina complete; areolet 2.1 as wide as length of second recurrent vein; second recurrent vein with two narrowly separated bullae (only one bulla in all other species of the subgenus); claws of middle tarsi pectinate on their basal 0.4 (front tarsal claws missing in the only specimen at hand).

Black. Face and clypeus except for area around clypeal fovea, interantennal process, side of face, under side of scape and pedicel, labrum, first three segments of maxillary palpus, stripe along upper margin of pronotum, stripe along lateral edge of propleurum, subtegular ridge, short vertical mark near front edge of mesopleurum, longitudinal stripe just below sternaulus, apical 0.4 of scutellum, small spot on postscutellum, large spot on metapleurum, small spot at apex of second lateral area of propodeum, small spot on tegula, apices of coxae, most of upper side of hind coxa, trochanters, narrow bases of front and middle femora, broad apices of all femora, front and middle tibiae and tarsi, hind tibia dorsobasally for 0.5 its length, apical 0.8 of first tergite, apicolateral corner and small indefinite median apical mark on second tergite, apical 0.38, 0.32, 0.3, and 0.25 of tergites three through six, respectively, transverse median apical spot on seventh tergite, and genitalia except basally, pale yellow; antenna reddish brown, darker above and its scape and pedicel yellow beneath; mandible ferruginous, darker apically; labial palpus and last two segments of maxillary palpus light brown; front femur pale brown, darker below, yellow narrowly at base and rather broadly at apex; middle femur brown, yellow narrowly at base and rather broadly at apex; hind tibia dark brown except where noted as yellow; hind tarsus dark brown; wing light brown, the stigma pale brown and the third cubital and discoidal cells paler.



Figures 55, 56.—Localities: 55 (left), *Metopius* (*Cultrarius*) *pectoralis;* 56 (right), *M.* (*C.*) *ultimatus.*

Type: ♂, Columbia, Mo., Sept. 28, 1938, W. S. Craig (Washington, USNM 63621).

A female described by Brues (1907, Bull. Wisconsin Nat. Hist. Soc., vol. 5, p. 56) from Fedor, Lee Co., Tex., as the female of *Metopius birkmani* probably belongs to the present species. His specimen is in the Milwaukee Public Museum.

8. Metopius (Cultrarius) ultimatus Davis, new combination

Figures 168,a; 184,h

Metopius ultimatus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 199; ♂. Type: ♂, Illinois (Philadelphia).

Front wing 8.5 to 11 mm. long; facial shield about 1.3 as high as wide, with a strong median longitudinal carina, with coarse punctures and scattered smaller punctures on the interspaces, the interspaces about 0.6 as great as diameter of coarse punctures; wider segments of flagellum about 2.6 as wide as long; galea elongate, projecting, about 0.8 as long as mandible, with very few setae except on the edges; glossa narrow, long, projecting beyond galea; second segment of maxillary palpus swollen, a little flattened, in the male about 3.3 as long as wide, in the female about 2.0 as long as wide; punctures on mesopleurum and metapleurum coarse, those on mesopleurum separated by about 0.7 their diameter, those on metapleurum separated by about 1.5 their diameter; prepectal carina complete; areolet about 2.0 as wide as length of second recurrent vein; claws of front and middle tarsi pectinate on their basal 0.3 to 0.4.

Black. Face except for a median longitudinal mark on facial shield in female, interantennal process, side of frons, spot at side of clypeus in male, under side of scape and often of pedicel in male, usually under side of scape in female, labrum of male, second segment of maxillary palpus, narrow stripe next to upper margin of pronotum, large apicolateral corner of scutellum, postscutellum, spot covering most of hind half of metapleurum, spot at apex of area dentipara, apex of coxae in front, most of hind coxa above, apex of front and middle trochanters, second trochanter of hind leg and all but base of its first trochanter, apex of femora, extreme base of front and middle femora, front and middle tibiae and tarsi except that the tibiae are brownish below and the tarsi brownish apically, basal 0.2 of hind tibia and in male sometimes subbasal blotches on hind tibia, apical 0.65 of first tergite, small apicolateral corner of second tergite, apical 0.25 of third tergite, apical 0.2 of fourth tergite (narrowed laterally), apical 0.2 of fifth tergite (narrowed laterally), apical 0.1 ± of sixth tergite (interrupted medially) of male and sometimes of female, and male genitalia, white; palpi except for second segment of maxillary palpus brownish; under side of flagellum tinged with brown; hind tarsus brown; wings strongly infuscate.

Specimens: ♂, southern Illinois, C. Robertson (Washington). ♂ (type), Illinois (Philadelphia). ♂, ♀, Jay Co., Ind., Sept. 15, 1923, B. Montgomery (Cambridge). ♀, LaFayette, Ind., Sept. 16, 1914 (Washington). ♂, Douglas Co., Kans., Sept. 29, 1948, R. H. Beamer (Lawrence). ♂, Lawrence, Kans., Aug. 31, 1951, A. T. McClay (Townes). ♀, Lawrence, Kans., Sept. 28, 1952, G. Heinrich (Heinrich). ♂, Chalmette, La., C. L. Remington (Cambridge). ♀, Columbia, Mo., Sept. 16, 1939, W. S. Craig (Washington). 2♀, Ozark Lake, Mo., Sept. 21, 1939, E. C. Van Dyke (San Francisco). ♂, Agricultural College, Miss., October 1895, H. E. Weed (Corvallis). 2♀, Hattiesburg and near Hattiesburg, Miss., Oct. 6, 1944 and Oct. 10, 1943, C. D. Michener (New York). ♂, West Point, Nebr., Sept. 9, 1912, J. C. Bridwell (Washington). 2 ♂, 1 ♀, Kearney, N. J., Aug. 2 and 31, 1933 and Sept. 5, 1933, M. A. Cazier (New York). ♂, Moorestown, N. J., Sept. 26, 1924, J. B. Cronin (Washington). ♂, Towaco, N. J., Sept. 3, 1936, M. A. Cazier (New York). ♀, Columbus, Ohio, September, J. C. Bridwell (Washington). ♂, Franklin Co., Ohio, Sept. 3, 1942, R. Strandtmann (Townes). ♀, Dallas, Tex., Oct. 31, 1937 (Madison). 2♀, on *Aster*, Hopkins Co., Tex., Sept. 22, 1939 (Townes). ♀, Plano, Tex., October 1907, E. S. Tucker (Washington). ♂, 2♀, Victoria, Tex., Oct. 14, 1900, J. D. Mitchell (Washington). ♀, on flowers of *Solidago*, Bolivar, W. Va., Sept. 25, 1942, H. Townes (Townes). ♂, ♀, no data (Washington).

This species occurs in the Carolinian and Austroriparian faunas. Adults have been collected on flowers of *Solidago* and of *Aster* in early fall.

9. Metopius (Cultrarius) birkmani Brues, new combination

Figure 185,a

Metopius birkmani Brues, 1907, Bull. Wisconsin Nat. Hist. Soc., vol. 5, p. 56; ♂ (♀ misdetermined). Lectotype (hereby selected): ♂, Lee Co., Tex., Oct. 2, 1905 (Milwaukee).

Front wing 7 to 8.5 mm. long; facial shield about 1.4 as high as wide, with a strong median longitudinal carina, with coarse punctures of variable size, the interspaces about 0.8 the punctural diameter; wider segments of flagellum about 2.0 as wide as long; galea and glossa as in *M. ultimatus;* second segment of maxillary palpus swollen and slightly flattened, about 0.3 as long as wide in male, about 1.7 as long as wide in female; mesopleurum and metapleurum with medium sized to coarse punctures, the punctures sparse, very sparse, or almost lacking, particularly on disc of metapleurum; prepectal carina complete; areolet about 2.0 as wide as length of second recurrent vein; claws of front and middle tarsi pectinate on their basal 0.3 to 0.5.

Black, the black on the body and legs, especially on the legs, often tinged with or replaced by ferruginous. Face except sometimes for fuscous streaks along median carina in female, interantennal process, side of frons, cheek, labrum, much of mandible, first and second segments of maxillary palpus, basal part of galea, scape and pedicel except above, much of propleurum, broad stripe on upper margin of pronotum, large triangle on mesoscutum at front end of notaulus, large spot on tegula, large oblong spot on upper anterior part of mesopleurum, longitudinal stripe below sternaulus, scutellum, postscutellum, metapleurum except marginally, spot on apex of area dentipara, front and middle legs of male except base of coxae and stripe on hind side of femora, apex of front and middle coxae of female in front, front side of trochanter of front and middle legs of female, upper side of front and middle tibiae of female, much of front and middle tarsi of female, apical and dorsal spots on hind coxa of male, hind trochanters, dorsal edge and outer half of hind femur of male, hind tibia and tarsus of male, dorsobasal stripe on hind tibia of female, first tergite except for base, apical 0.8 to 0.9 of second tergite, apical 0.7 to 0.8 of third tergite, apical 0.6 to 0.7 of fourth through sixth tergites and of seventh tergite of male, and male genitalia, yellow; flagellum and mouth parts brownish ferruginous except where described as yellow; wings light brown, the front wing beyond the areolet mostly subhyaline.

The coloration above represents the specimens other than the male lectotype. In the lectotype, the yellow triangle on the anterior end of the notaulus is prolonged backward as a narrow line, to reach a yellow quadrate spot on center of mesoscutum. The legs are yellow and fulvous rather than yellow and ferruginous or blackish. This lectotype is from Texas rather than from California or Arizona as are most of the rest of the specimens. The female paratype described by Brues is not *birkmani* but a different species, probably *M. pectoralis*.

Specimens: ♀, Tuscon, Ariz., Oct. 12, 1927, J. M. Braezeale (Washington). ♂, Tucson, Ariz., October 1926, C. A. Catlin (Washington). ♂, Phoenix, Ariz., W. W. Jones (Townes). ♂, near Alcardo, Kern Co., Calif., Sept. 8, 1947 (Townes). ♀, Cabazon, Calif., Nov. 7, 1934, A. L. Melander (Cambridge). ♀, Indio, Calif., Nov. 1, 1953, J. C. Hall (Davis). 3♂, Whitewater, Calif., Oct. 27, 1934, A. L. Melander (Cambridge). ♀, Dallas, Tex., Sept. 19, 1905, C. R. Jones (Washington). ♂, W. W. Jones (Townes). ♂ (lectotype), Lee Co., Tex., Oct. 2, 1905, G. Birkman (Milwaukee).

This is a species of the Southwest. Adults occur in fall.

10. Metopius (Cultrarius) secundus, new species

FIGURE 185,b

Female type: Front wing 8 mm. long; facial shield 1.2 as high as wide, without a median carina, with rather dense fine punctures and very sparse large punctures; clypeus with a weak median vertical carina arising from basal point of facial shield (this lacking in the other species of the subgenus); wider segments of flagellum about 3.0 as wide as long; galea and glossa as in *M. ultimatus:* second segment of maxillary palpus pyriform but a little flattened and asymmetric, about 2.3 as long as wide; punctures on mesopleurum and metapleurum rather coarse, their interspaces about 0.7 the punctural diameter; prepectal carina crossing sternaulus but absent more dorsad; claws of front and middle tarsi pectinate on their basal 0.3±;

first tergite in profile with a long flat anterodorsal face which is about 3.0 as long as dorsal face (all other species of the subgenus except *rileyi* have the anterodorsal face about as long as or shorter than the dorsal face); propodeum in profile almost flat, sharply declivous; ovipositor about 1.8 as long as apical depth of abdomen, its valvifers somewhat elongate.

Black. Wide margin of face laterally and above, interantennal process, side of frons, stripe on upper margin of pronotum, broad spot over subtegular ridge and a connecting vertical oval area below its front part, apical 0.3 of scutellum, postscutellum, most of metapleurum, spot at apex of area dentipara, dorsal side of front and middle tibiae except at apex, apical 0.65 of first tergite, apicolateral mark on second tergite, and apical 0.25, 0.35, 0.38, and 0.4 (a little broadened sublaterally) of third through fifth tergites, respectively, yellow; basal 0.4 of antenna red-brown, paler basally; trochanters and front tibia and tarsus fulvous brown; front and middle coxae and femora and hind tibia and tarsus brown; hind femur blackish brown; all femora pale brown at apex; wings tinged with light brown, the front wing a little darker anteriorly. its stigma yellowish brown.

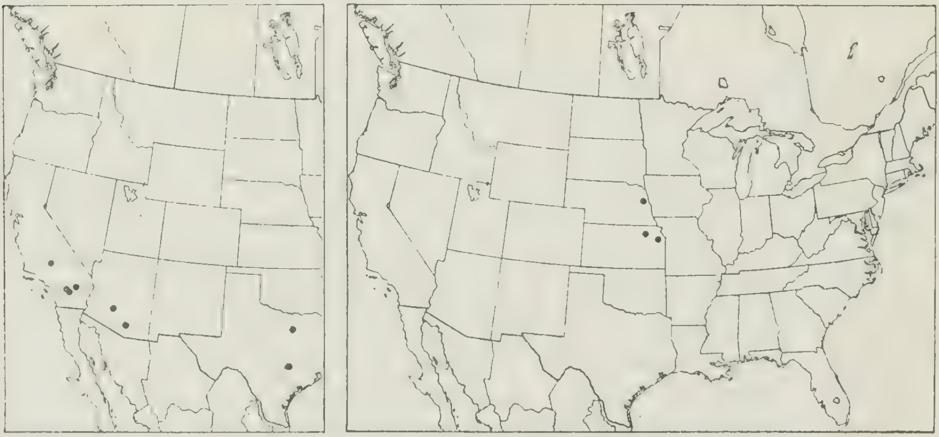
Type: ♀, "San Janacio," N. Mex., September 1, Porter and Cockerell (Washington, USNM 63622).

11. Metopius (Cultrarius) rileyi Marlatt

FIGURES 168,b; 185,c

Metopius rileyi Marlatt, 1891, Proc. Ent. Soc. Washington, vol. 2, p. 103; ♀. Lectotype (hereby selected): ♀, Riley Co., Kans., September, Marlatt (Washington).

Front wing 6.5 to 7.5 mm. long; facial shield rather narrow and small, about 1.3 as high as wide, without a median carina, its surface



FIGURES 57, 58.—Localities: 57 (left), *Metopius* (*Cultrarius*) *birkmani;* 58 (right), *M.* (*C.*) *rileyi.*

with irregular swellings and close, moderate sized, deep punctures; galea and glossa as in *M. ultimatus*; second segment of maxillary palpus only weakly swollen, in the female about 3.5 as long as wide; tegula rather strongly and densely punctate; punctures on mesopleurum coarse, strong, and subadjacent; punctures on metapleurum very coarse, separated by about 0.5 their diameter; prepectal carina crossing sternaulus but absent more dorsad; scutellum shorter than in other species of the subgenus *Cultrarius*, about 0.56 as long as wide; claws of front and middle tarsi pectinate on their basal 0.25±; first tergite in profile with a long, straight anterodorsal face but no dorsal face (All other species of the subgenus except *secundus* have the anterodorsal face about as long as or shorter than the dorsal face.); propodeum in profile almost flat, sharply declivous; ovipositor heavy, compressed, about as deep as hind tibia, about 3.5 as long as the apical depth of abdomen and 0.8 as long as abdomen; valvifers almost as long as ovipositor, which permits a folding of the ovipositor within the subgenital plate leaving little of it exposed, or when exserted the ovipositor and its valvifers give the "geniculate" appearance ascribed by Davis to this species when he based his genus *Cultrarius* on it. The species *M. secundus* has an ovipositor intermediate between that of *M. rileyi* and those of the other species of the subgenus.

Black. Upper lateral part of face, interantennal process, side of frons, short stripe along upper margin of pronotum, subtegular ridge, posterior half of metapleurum and of scutellum, postscutellum, apicolateral spot on propodeum, posterior 0.25± of first five tergites, and posterior 0.35 of sixth tergite, yellow; legs dark reddish brown, their trochanters paler and the apex of femora, upper side of front and middle tibiae, and extreme base of hind tibia, yellow; wings pale brown, the front third of the front wing darker brown.

Specimens: ♀, Douglas Co., Kans., Sept. 29, 1948, R. H. Beamer (Lawrence). ♀, Lawrence, Kans., Oct. 1, 1952, G. Heinrich (Heinrich). ♀ (lectotype), Riley Co., Kans., September, C. L. Marlatt (Washington). ♀, Riley Co., Kans., October, C. L. Marlatt (Washington). ♂, West Point, Nebr., September 1887 (Philadelphia). ♀, South Dakota, C. L. Marlatt (Washington). ♀, South Dakota (Philadelphia).

This is a species of the Great Plains. It is adult in fall.

4. Subgenus Peltales, new subgenus

Figure 167,b

Facial shield escutcheon-shaped, its upper edge almost straight but a little indented below each antenna, its lower edges roundly curved to the basal point, its disc without a median carina; interantennal process triangular to erect rectangular, depressed medially and with strong dorsolateral raised flanges; frons often with a median tubercle between the interantennal process and the median ocellus; clypeus margin weakly arcuate, a little raised away from base of labrum; upper tooth of mandible acute and connected with the ventral condyle by a prominent ridge; lower tooth of mandible small or minute, strongly impressed so that it is difficult to see and the mandible appears twisted; maxilla and labium short; temple almost flat; occipital carina very close to foramen magnum, complete; prepectal carina weakly angled above the sternaulus, more dorsad reaching almost to subtegular ridge, gradually approaching but ending well separated from front edge of mesopleurum; second recurrent vein with one bulla; hind femur about three times as long as deep; tarsal claws apparently simple; first tergite rather small, in profile flat or weakly rounded dorsally and roundly declivous basally; male clasper convex, without a lateral ridge.

Subgenotype: *Metopius errantia* Davis.

Of this subgenus we have seen the Mexican *Metopius scutatifrons* Cresson 1874 (new combination in *Peltales*), four undetermined Neotropical species, and the two Nearctic species treated below.

Key to the Nearctic species of Peltales

1. Mesoscutum entirely black; punctures on mesopleurum large, separated by about 0.7 their diameter; frons with an acute tooth below median ocellus.
1. **errantius** Davis

Mesoscutum black with 2 longitudinal yellow lines which are connected posteriorly; punctures on mesopleurum rather small, separated by about 1.5 their diameter; frons with a weak swelling below median ocellus.
2. **notatus,** new species

1. Metopius (Peltales) errantius Davis, new combination

Front wing 6.3 to 8.5 mm. long; facial shield about 1.0 as high as wide, its point distant from apical margin of clypeus; interantennal process about 0.65 as high as wide, dorsally adnate to frons in female, somewhat raised from frons in male; frons with sharp close punctures and a pointed tubercle just above interantennal process; wider flagellar segments about 1.8 to 2.1 as wide as long; second segment of maxilla apically somewhat enlarged in male, apically globular in female; punctures on mesopleurum large, separated by about 0.7 their diameter; first tergite in profile about 1.7 as long as high, weakly rounded above; third and fourth tergites with a median carina; third to fifth tergites with strong oblique grooves in their lateral faces; apex of sixth tergite of male simple, of female deflexed medially to make a broad, weak, median emargination.

There are four subspecies, as treated below.

Key to the subspecies of Metopius errantius

1. Yellow apical band on fifth tergite occupying about 0.15 of the segment's length at the midline (figs. 185,d,e); punctures on third tergite moderately crowded, separated by rounded ridges 2
   Yellow apical band on fifth tergite occupying about 0.35 the segment's length at the midline (figs. 185,f,g); punctures on third tergite strongly crowded, separated by sharp ridges 3
2. Ground color of abdomen and side of thorax blackish; range: Alleghenian and Carolinian faunas . . . . **1a. errantius errantius** Davis
   Ground color of abdomen and side of thorax medium brown; range: Florida. **1b. errantius floridanus,** new subspecies
3. Yellow mark on tergites 3 and 4 not extending forward much if any beyond the midlength of the tergite (fig. 185,f); range: Arizona. **1c. errantius arizonicus,** new subspecies
   Yellow mark on tergites 3 and 4 extending forward sublaterally almost to the front margin (fig. 185,g); range: California. **1d. errantius calfornicus,** new subspecies

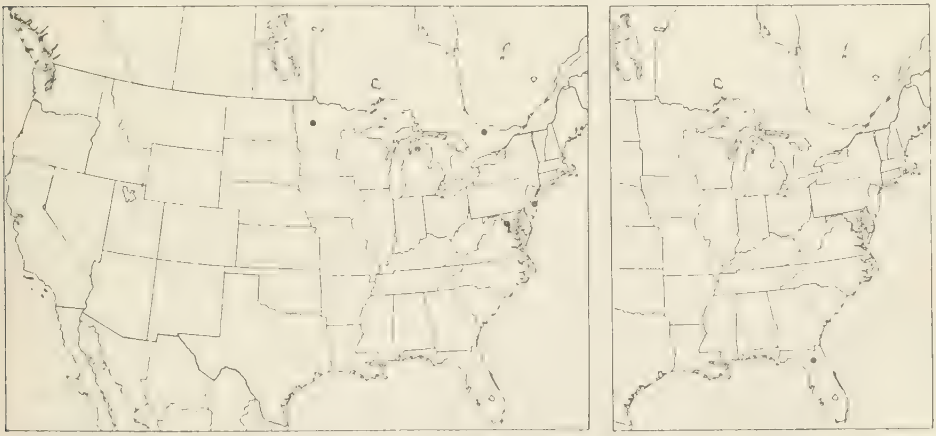
1a. Metopius (Peltales) errantius errantius Davis

FIGURES 167,b; 185,d

Metopius errantia Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 199; ♀. Type: ♀, Gaylord, Mich. (East Lansing).

Punctures on third tergite moderately crowded, separated by rounded ridges.

Black. Face except below the shield and for a central mark in the shield, interantennal process, side of frons, scape and pedicel beneath, free margins of labrum in whole or laterally, part of mandible, maxilla and labium of male, apical mark on second maxillary segment of female, subtegular ridge, often all or part of upper margin of pronotum, often a narrow vertical stripe below subtegular ridge, apex and lateral



FIGURES 59, 60.—Localities, subspecies of *Metopius* (*Peltales*) *errantius:* 59 (left), *errantius;* 60 (right), *floridanus.*

basal part of scutellum, often the postscutellum, often a small spot at apex of area dentipara, first trochanter more or less, apex of femora (more broadly in front), apical 0.4 of first tergite, often small apical corners of second tergite, apical 0.3 of third tergite, apical 0.2 of fourth tergite (wider laterally), and apical 0.12 of fifth tergite (sometimes interrupted medially), yellow; upper side of scape and pedicel and under side of flagellum light reddish brown, the flagellum shading to blackish beyond the middle; legs light brown to blackish brown, the front legs palest and the hind legs darkest; wings subhyaline, the front wings infuscate anteriorly, especially in the radial cell.

Specimens: ♀ (type), Gaylord, Mich. (East Lansing). ♀, Itasca, Minn., July 1908 (Cambridge). ♀, Lakehurst, N. J., July 3, 1909, J. Bequaert (Cambridge). ♂, reared from Geometridae, Algonquin Park, Ont., Sept. 6, 1945 (Townes). 2♀, Dunn Loring, Va., Aug. 7 and 21, 1949, K. V. Krombein (Townes).

This subspecies is in the Carolinian and Alleghenian faunas.

1b. Metopius (Peltales) errantius floridanus, new subspecies

FIGURE 185,e

Female type: Similar to the female of *M. errantius errantius* except that the blackish areas in center of frons, side of thorax, propodeum beyond its basal transverse carina, tegula, legs except on hind coxa and femur, and abdomen are brown rather than blackish. Also, the basal half of the antenna is paler brown than in *M. errantius errantius*.

Type: ♀, taken in dense woods, Alachua Co., Fla., June 24, 1954, H. A. Denmark (Washington, USNM 63623).

1c. Metopius (Peltales) errantius arizonicus, new subspecies

FIGURE 185,f

Female type: Punctures on third tergite strongly crowded, separated by sharp ridges.

Black. Interantennal process and adjacent mark on facial shield, band along lateral edge of facial shield, side of frons, under side of scape and pedicel, upper edge of pronotum, subtegular ridge and a vertical stripe below it, narrow apices of femora (widened on the front side), front face of fore tibia and front stripe on middle tibia not reaching the apex, part of middle and hind first trochanters, apex and laterobasal part of scutellum, postscutellum, spot at apex of area dentipara, apical 0.8 of first tergite, apicolateral corner of second tergite, apical 0.4 of third tergite, apical 0.35 of fourth tergite (broadened laterally), apical 0.3 of fifth tergite (much broadened laterally), and lateral spot on sixth tergite, yellow; mandible medially, upper side of scape and pedicel, basal half of flagellum, tegula except for a yellow spot, front and middle legs beyond coxae except where noted as yellow, hind trochanters, base of hind femur, and thorax at leg attachments, light reddish-brown; front and middle coxae blackish brown; hind femur, tibia, and tarsus dark brown except as described otherwise; wings pale brown, the front 0.35 of front wing darker brown.

Type: ♀, Chiricahua Mts., Ariz., July 4, 1940, L. C. Kuitert (Lawrence).

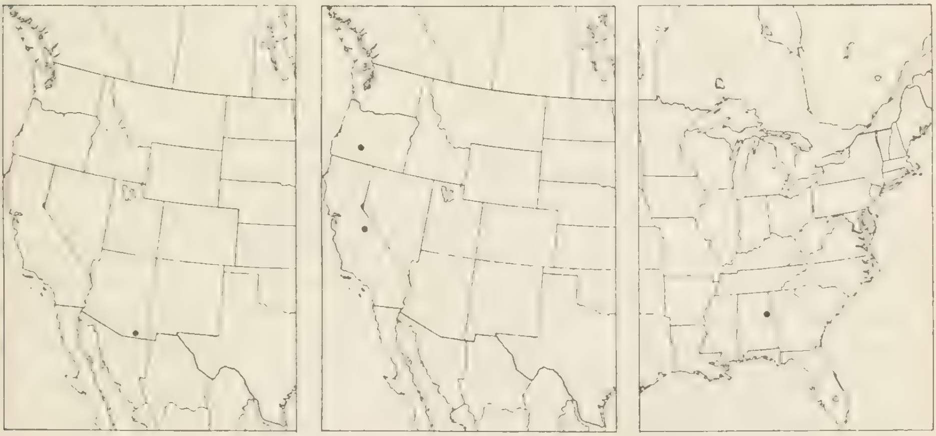
1d. Metopius (Peltales) errantius californicus, new subspecies

Figure 185,g

Punctures on third tergite strongly crowded, separated by sharp ridges.

Male: Colored like the female except that yellow markings on abdomen are a little less extensive.

Female: Black. Interantennal process and adjacent mark on facial shield, band along lateral and ventral edges of facial shield (narrowest below), side of frons, lateral corner of labrum, under side of scape and pedicel, second segment of maxillary palpus, broad upper edge of pronotum, tegula, subtegular ridge, triangular mark below subtegular ridge, narrow apices of front and middle femora, broad apex (especially anteriorly and below) of hind femur, parts of first trochanters, front faces of front and middle tibiae, scutellum except basally, postscutellum, a spot at apex of area dentipara, first tergite, apical 0.35 of second tergite (broader laterally), and third to sixth tergites except for narrow basolateral stripe and a large median basal area, yellow; part of mandible, upper side of scape and pedicel, basal half of flagellum, and tinges on front and middle legs light reddish-brown;



Figures 61–63.—Localities, species of *Metopius* (*Peltales*): 61 (left), *errantius arizonicus*; 62 (center), *errantius californicus*; 63 (right), *notatus*.

hind tibia and tarsus dark brown, the tibia with an external basal yellow spot; wings pale brown, the front 0.35 of front wing darker brown.

Type: ♀, Fish Camp, Calif., July 14, 1948, H., M., G., and D. Townes (Washington, USNM 63624).

Paratype: ♂, 17 miles west of Chemult, Klamath Co., Oreg., July 25, 1955, G. R. Ferguson (Townes).

2. Metopius (Peltales) notatus, new species

FIGURE 185,h

Female type: Front wing 7 mm. long; facial shield 1.05 as high as wide, its point rather close to margin of clypeus; interantennal process 1.0 as high as wide, dorsally quite free from frons; frons with rather indistinct small punctures and a median swelling; wider flagellar segments about 2.0 as wide as long; second segment of maxilla apically globular; punctures on mesopleurum rather small, separated by about 1.5 their diameter; first tergite in profile 2.0 as long as high, very weakly rounded above; third and fourth tergites with a median carina; third to fifth tergites with strong oblique grooves in their lateral faces; apex of sixth tergite deflexed medially to make a broad, weak, median emargination.

Brownish black. Head and mouthparts except for margins of mandible, frons above each antennal socket, area including ocelli and reaching top of eye, back of head except for broad posterior orbits and transverse band below hind ocelli, under side of scape and pedicel, pronotum except for longitudinal area paralleling but distant from its upper margin, propleurum laterally, parallel longitudinal stripes on mesoscutum joined by a transverse bar near hind edge of mesoscutum, apical half and lateral basal part of scutellum, postscutellum, subtegular swelling, area covering most of mesopleurum and joined posteriorly with a longitudinal mark beneath sternaulus, small submedian posterior spot on mesosternum, most of upper division of metapleurum, lower division of metapleurum except in its lower front area and marginally (the dark lower front area enclosing a small yellow spot), propodeum except basally in spiracular area and in third median area, front and middle legs except for large mark on femora behind (not reaching their bases and apices), U-shaped mark on hind coxa above, hind trochanters except first trochanter basally, hind femur except for its front and hind faces, hind tibia and tarsus, first tergite except basally, apical 0.4 of second through fourth tergites, apical 0.35 of fifth tergite, apical 0.3 of sixth tergite, and apical band on seventh tergite, yellow, the yellow on tergites extending forward laterally; tegula brownish yellow centrally; wings tinged with yellowish brown.

Type: ♀, Pyriton, Ala., H. H. Smith (Washington, USNM 63625).

5. Subgenus Tylopius, new subgenus

FIGURE 169,a

Facial shield escutcheon-shaped but rounded below and seldom with a discernible basal point; upper edge of facial shield weakly arcuate; interantennal process broadly triangular, without a median carina, its sides not elevated, continuous dorsally with a high lamella on frons which ends abruptly near middle of frons; margin of clypeus broad and almost straight, not reflexed, close to the base of labrum; mandible with two teeth, the lower tooth shorter and a little impressed; maxilla and labium short; temple moderately rounded or rather flat; occipital carina moderately close to foramen magnum, complete; prepectal carina angled strongly forward just above sternaulus almost to reach front edge of mesopleurum, then paralleling front edge of mesopleurum to near subtegular ridge, sometimes partially obsolete above sternaulus; second recurrent vein with one bulla or rarely with two; hind femur about three times as long as deep; tarsal claws apparently simple; first tergite in profile pyramidal, its dorsal face straight and meeting the straight dorsobasal face at an angle; male clasper depressed, with a lateral ridge.

Subgenotype: *Metopius pinatorius* Brullé, = *M. micratorius* of authors, not of Fabricius.

The subgeneric name is from the Greek "tylus," a callosity, plus the terminal part of the name "Metopius," referring to the shape of the interantennal process.

This is a Holarctic group. Clément (1930, Konowia, vol. 8, pp. 365–408) treats 16 Palaearctic species. To these should be added *Metopius* (*Ceratopius*) *coreanus* Uchida 1930, from Korea, and *Metopius* (*Ceratopius*) *sapporensis* Uchida 1930, from Japan (new synonyms of *sapporensis: Metopius* (*Ceratopius*) *arakawai* Uchida, 1930 and *Metopius* (*Ceratopius*) *takabayashii* Uchida, 1930). There are four Nearctic species, which are treated below.

Key to the Nearctic species of subgenus Tylopius

1. Abdomen elongate (fig. 186,e), the fourth tergite about as long as wide; second tergite rather sparsely punctate, the interspaces averaging about 0.7 the diameter of the punctures; apical pale band on first tergite interrupted medially; front wing 14 to 15 mm. long . . . . **4. basalis** Cresson

   Abdomen not elongate (figs. 186,a–d), the fourth tergite about 0.75 as long as wide; second tergite densely punctate, the interspaces reduced to lines; apical pale band on first tergite not interrupted medially; front wing 7 to 13 mm. long 2

2. Hind femur black with white or yellow markings of approximately equal size at base and apex; facial shield about 0.97 as high as wide; space between facial shield and clypeal margin about 0.08 as great as height of shield. **3. edwardsii** Cresson

Hind femur black, broadly white or yellow basally on the outer side, or sometimes the white or yellow covers entire femur except for an apical black mark which is most extensive on inner side; facial shield about 1.05 as high as wide; space between facial shield and clypeal margin about 0.13 as great as height of shield 3

3. Second recurrent vein with one bulla; tergites 4 to 6 apically white or yellow, rarely mostly yellow (figs. 186,a,b) . . . . **1. pollinctorius** Say

Second recurrent vein with two bullae; tergites 4 to 6 yellow with a discal pair of black spots (fig. 186,c) . . . . **2. bellus** Cresson

1. Metopius (Tylopius) pollinctorius Say, new combination

Front wing 7 to 13 mm. long; facial shield broadly rounded below, without a trace of a basal point, the shield about 1.05 as high as wide and separated from margin of clypeus by about 0.13 its height; second recurrent vein with one bulla; abdomen moderately broad, its fourth tergite about 0.77 as long as wide; second tergite densely punctate, the interspaces reduced to lines; sixth tergite of female about 1.0 as long as wide, with rather coarse evenly spaced punctures; seventh tergite of male with coarse, evenly spaced punctures.

This species is very close to the Palaearctic *Metopius pinatorius* Brullé (see fig. 169,a), which may prove to be a subspecies of it. It is represented in North America by two subspecies as described below:

1. Hind tibia entirely or largely black; body markings whitish; range: East of 100th meridian and westward to the Pacific in Canada and the northern United States . . . . **1a. pollinctorius pollinctorius** Say

Hind tibia entirely yellow; body markings yellow; range: Washington, Nevada, and California . . . . **1b. pollinctorius nevadensis** Cresson

1a. Metopius (Tylopius) pollinctorius pollinctorius Say, new combination

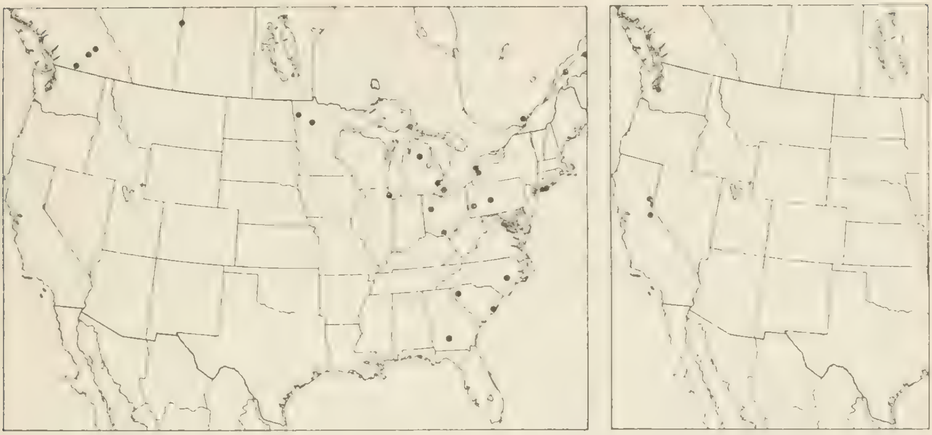
FIGURE 186,a

Peltastes pollinctorius Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 245 (Leconte ed., vol. 2, p. 700); ♂, ♀. Types: Indiana and Pennsylvania (destroyed).

Metopius cordiger Brullé, 1846, *in* Le Peletier de Saint-Fargeau, Histoire naturelle des insects. Hyménoptères, vol. 4, p. 120; ♂. Type: ♂, Carolina (Paris).

BIOLOGY: Schaffner and Griswold, 1934, Misc. Publ. U. S. Dep. Agr., No. 1881, p. 144.

Male: Black, the abdomen usually with a dark metallic blue tint. Face, interantennal process, side of frons, often most of clypeus, often most of cheek, mouthparts except apex and margins of mandible and usually the labial palpus, under side of scape and pedicel, large lenticular mark along upper edge of pronotum, usually a large vertically elliptical mark on upper part of mesopleurum next the prepectal carina, sometimes a narrow stripe on subtegular ridge, apex of scutellum and usually its basolateral appendage, transverse band on postscutellum, spot at apex of area dentipara, most of trochanters and bases of femora (including the basal 0.5± of hind femur in front),



FIGURES 64, 65.—Localities, subspecies of *Metopius* (*Tylopius*) *pollinctorius:* 64 (left) *pollinctorius;* 65 (right), *nevadensis.*

all or much of front side of front and middle femora, sometimes part to all of front and middle tarsi, rarely front side of hind tarsi, rarely anteroventral part of hind tibia except at base, apex of front and middle coxae, apical 0.6± of first tergite, apical margin of second tergite laterally, apicolateral corners or a narrow apical band on third tergite, apical 0.25 of fourth tergite, apical 0.2 of fifth tergite, usually the apical 0.15 of sixth tergite, genitalia, and apical part of seventh and eighth sternites, white; flagellum light brown beneath, darker apically; wings more or less infuscate.

Female: Colored like the male, except that the facial shield has a large, broadly oval, central black area, and the cheek, clypeus, mouth parts, and genitalia are black.

Metopius pinatorius Brullé, 1846, has been listed as a synonym of *M. pollinctorius*, but a study of the type in Paris shows that they are from Europe, rather than from "Carolina" as reported by Brullé, and are the common European *Metopius micratorius* of authors, not of Fabricius.

In both sexes specimens from areas towards the Southeastern States have the wings progressively darker and the apical white band on the sixth tergite progressively narrower. In Austroriparian specimens the wings are strongly infuscate and the apical band on the sixth tergite very narrow or absent. In Canadian and Alleghanian specimens the wings are subhyaline and the apical band on the sixth tergite as wide as that of the fifth. These two coloration types intergrade in a gradual cline that does not permit subspecific distinctions.

Specimens (12♂, 40♀): From Alberta (Lloydminster); British Columbia (Mount Apex near Hedley at 6,000 ft., Okanagan Valley, and Trinity Valley); District of Columbia; Georgia (Tifton); Illinois (Chicago); Manitoba (Husavick); Maryland (Takoma Park); Massachusetts; Michigan (Detroit, Roscommon Co., and Whitefish Point in Chippewa Co.); Minnesota (Itasca Park and Polk Co.); New Jersey (Montclair); New York (Buffalo, "Halfway in the Hollow Hills of Long Island," and Smithtown); North Carolina (Clinton); Nova Scotia (vicinity of Medway in Queens Co.); Ohio (Bellefontaine and Scioto Co.); Ontario (Fort Erie and Point Pelee); Pennsylvania (Charter Oak and Pittsburgh); Quebec (Gaspé Co., Luceville, and St. Esprit); South Carolina (McClellanville and Ware Shoals); Virginia (Arlington, Chain Bridge, and Falls Church); and Wisconsin ("Cranmoor").

Collecting dates are from early summer to early fall.

Early and late seasonal dates of interest are: May 15 at McClellanville, S. C.; May 24 at Clinton, N. C.; May 30 at Tifton, Ga.; June 7 in the Hollow Hills of Long Island, N. Y.; June 13 at Falls Church, Va.; June 17 in Scioto County, Ohio; September 8 at Detroit, Mich.; September 13 at Chain Bridge, Va.; September 27 at Ware Shoals, S. C.; October 8 at "Cranmoor," Wis., and October 10 at Falls Church, Va.

There are five reared specimens as follows: ♀, from *Apatela* sp., Buffalo, N. Y., emerged April 1880, E. P. Van Duzee. 2♀, from *Apatela* on *Salix*, Bellefontaine, Ohio, emerged February 1917, F. H. Benjamin (Ithaca). ♀, from hairy caterpillar on chokecherry, Trinity Valley, B. C., collected July 8, 1938, emerged Mar. 29, 1939, K. Graham. ♀, from *Gluphisia septentrionalis*, Luceville, Que., emerged Apr. 7, 1940.

We have collected the subspecies several times, always flying at one to two meters elevation along the edges of deciduous forests. In flight, it looks superfically like *Eumenes fraterna*.

Schaffner and Griswold (loc. cit.) report rearing this subspecies from *Apatela oblinita* at Hudson, Maine, the parasite overwintering in the host pupa and giving evidence of one generation per year. Weiss (1924, Journ. New York Ent. Soc., vol. 32, p. 74) mentions a rearing from the cocoon of *Actias luna*, collected at Elizabeth, N. J.

This subspecies is the commonest and most widespread representative of the genus in North America. It occurs along the edges of deciduous forests. Adults occur from early summer to early fall.

1b. Metopius (Tylopius) pollinctorius nevadensis Cresson, new combination

FIGURE 186,b

Metopius nevadensis Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxviii; ♂, ♀. Lectotype: ♀, Nevada (Philadelphia).

Metopius edwardsii Townes, 1945, Mem. Amer. Ent. Soc., vol. 11, p. 571, synonymy, in part.

Male: Black. Face, much of clypeus except near clypeal fovea, much of cheek, interantennal process, side of frons, mouth parts except apex and margins of mandible, underside of scape and pedicel, underside of flagellum to near middle, lenticular mark along upper margin of pronotum, vertical oval mark on front part of mesopleurum next the prepectal carina, mark on subtegular ridge, narrow apex of scutellum (sometimes interrupted medially), small spot at apex of area dentipara, sometimes small spot on tegula, front and middle legs except for base of coxae and stripe on back side of femora, irregular apical and dorsal marks on hind coxa, hind trochanters, hind femur except for apical 0.1 to 0.4 and some apical blotches, hind tibia except for narrow apex, hind tarsus but often with apex of each segment brownish, apical 0.6 of first tergite, lateral apical corner of second tergite, subapical 0.1 of third tergite, apical 0.35 of fourth tergite, apical 0.4 of fifth and sixth tergites, apical 0.2 of seventh tergite, and genitalia and parts of adjacent sclerites, light yellow; wings tinged with reddish brown.

Female: Colored like the male except that the mouth parts are black with some yellow on the palpi, the facial shield has a large median black mark, the flagellum is fulvous except above, and the apical 0.25 of the sixth tergite is yellow.

This subspecies has basically the same color pattern as the subspecies *M. pollinctorius*, but with the light markings pale yellow rather than white, these yellow markings more extensive, especially on the legs and apical half of the abdomen, and the wings subhyaline, tinged with reddish brown.

The coloration described above is considered typical. Figure 186,b is from a female from Donner Pass, Calif., with unusually extensive yellow markings, as follows:

Black. Face, interantennal process, side of frons, labrum, spot on mandible, parts of palpi, lenticular mark along upper edge of pronotum, vertical elliptical mark on front part of mesopleurum next prepectal carina, small mark on subtegular ridge, apex and basolateral appendage of scutellum, transverse mark on postscutellum, irregular spot at apex of area dentipara, two small spots next base of middle coxa, apex of front coxa, all but basal part of middle coxa, front stripe, small posterior apical, and large ventral apical mark on hind coxa, apical 0.7 of first tergite, lateroapical spot on second tergite, subapical 0.18 of third tergite, and all of fourth, fifth, and sixth tergites except basal 0.15± and area surrounding the lateral oblique grooves, light yellow; legs beyond coxae light yellow except for posterior black stripes on front and middle femora, apical 0.65 of hind femur black posteriorly, apical posterior brown area on hind tibia, apex of first and second segments of hind tarsus brown and all of the third to fifth segments brown; wings tinged with reddish brown.

Specimens: ♀ (atypical coloration), Donner Pass, Calif., Aug. 1, 1948, H., M., G., and D. Townes (Townes). ♀, Sonora Pass, Calif., July 30, 1954, J. C. Downey (Townes). 4♂ and 2♀ (lectotype and paratypes), Nevada (Philadelphia). ♂, reared from reddish *Apatela*, probably near Puyallup, Wash., S. E. Crumb (Townes).

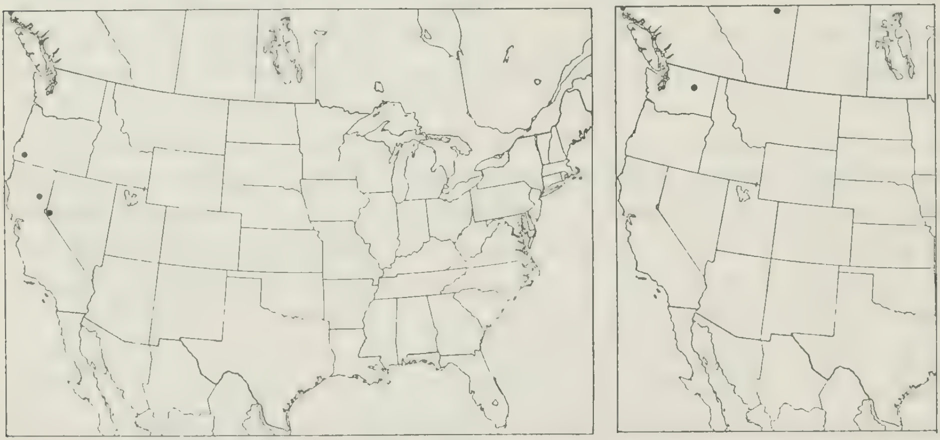
2. Metopius (Tylopius) bellus Cresson, new combination

FIGURE 186,c

Metopius bellus Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxviii; ♂. Type: ♂, Nevada (Philadelphia).

Front wing about 12 mm. long; second recurrent vein with two bullae. Otherwise structurally similar to *M. pollinctorius*.

Black. Face, clypeus except near clypeal foveae, cheek, interantennal process, side of frons, mouthparts, scape, and pedicel except above, broad upper margin of pronotum, large rectangular area on front half of mesopleurum, longitudinal stripe below sternaulus, sometimes small marks on metapleurum, scutellum except median basal stripe, postscutellum, propodeum near apex of area dentipara, tegula, front and middle legs except bases of coxae, hind coxa apically beneath and with small marks elsewhere, hind trochanters, hind femur (except apical 0.75 posteriorly, apical 0.6 dorsally, and a subapical triangle anteriorly), hind tibia, hind tarsus except for brownish apical part, all but base of first tergite, lateral stripe on second tergite excepting area in front of spiracle, third tergite (except for apical margin, area near spiracle, base, and large connecting area on disc), fourth, fifth, and sixth tergites (except for lateral oblique grooves, basal margins, and paired discal spots), seventh tergite except at base, and genitalia, yellow. Flagellum reddish brown above, yellowish brown beneath, paler basally. Wings tinged with reddish brown.



FIGURES 66, 67.—Localities, species of *Metopius* (*Tylopius*): 66 (left), *bellus;* 67 (right), *edwardsii.*

Specimens: ♀, "Mokel Hill," Calif., F. E. Blaisdell (San Francisco). ♂, 4 miles west of Quincy, Calif., June 26, 1949, E. I. Schlinger (Townes). ♂, Valley Hot Spring, Douglas Co., Nev., June 24, 1953, R. C. Betchel (Davis). ♂ (type), Nevada (Philadelphia). ♂, Kane Creek at 2,000 ft., 5 miles west of Gold Hill, Oreg., June 23, 1937, Bolinger and Jewett (Washington).

3. Metopius (Tylopius) edwardsii Cresson, new combination

Figure 186,d

Metopius edwardsii Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 376; ♂. Type: ♂, Washington Territory (Philadelphia).

Metopius edwarsii Townes, 1945, Mem. Amer. Ent. Soc., vol. 11, p. 571, synonymy, in part.

Front wing 9 to 11 mm. long; facial shield broadly rounded below, without a trace of a basal point, the shield about 0.97 as high as wide and separated from clypeal margin by about 0.08 its height; second recurrent vein with one bulla; abdomen moderately broad, its fourth tergite about 0.73 as long as wide; second tergite densely punctate, the interspaces reduced to lines; sixth tergite of female about 0.74 as long as wide, with close, coarse punctures; seventh tergite of male with close, coarse punctures.

Male: Black. Face, interantennal process, side of frons, scape and pedicel except above, labrum, broad stripe on upper margin of pronotum, small obsolescent stripe on subtegular ridge, spot at apex of area dentipara, apices of scutella, front and middle coxae apically above, trochanters except hind side of trochanter of front leg, front and middle femora at base, apex, above, and in front, basal and apical 0.18± of hind femur in front, narrowing to basal and apical 0.08± behind, tibiae except extreme apex of hind tibia, front and middle tarsi, hind basitarsus obscurely on basal 0.75±, apical 0.6 of first tergite, apicolateral corners of second tergite, apical 0.25 of third tergite, apical 0.17 of fourth tergite, apical 0.12 of fifth tergite, median half of apical margin of sixth tergite, and most of genitalia and subgenital plate, pale yellow; wings subhyaline, with a brown tinge.

Female: Black. Stripe covering lateral edge of facial shield, interantennal process and narrow adjacent margin of facial shield, basolateral part of frons, sometimes a small stripe along upper margin of pronotum, narrow apical margin of scutellum (interrupted medially), small spot at apex of area dentipara, apices of all femora and base of hind femur, hind trochanters except under side of first trochanter, front and middle tibiae and tarsi except part of hind side of tibiae, basal 0.7 of hind tibia, and abdominal marks as described in male, ivory-colored; flagellum brown beneath; wings subhyaline, tinged with brown.

Metopius coreanus Uchida, 1930, from Korea, is closely related to the present species. It differs in having the facial shield narrower, about 1.17 as high as wide.

Specimens: 2♀, Edmonton, Alta., July 15 and 26, 1929, E. H. Strickland (Ottawa). ♂ (type), Washington Territory (Philadelphia). ♂, July 4, 1914, Max Rühmann (Ottawa).

4. Metopius (Tylopius) basalis Cresson, new combination

FIGURE 186,e

Front wing 14 to 15 mm. long; facial shield rounded below, without a trace of a basal point, about 1.16 as high as wide and separated from clypeal margin by about 0.10 its height; second recurrent vein with one bulla; abdomen slender, its fourth tergite about 1.03 as long as wide; second tergite rather sparsely punctate, the interspaces about 0.7 the diameter of the punctures; sixth tergite of female about 1.2 as long as wide, with coarse, evenly spaced punctures; seventh tergite of male with rather coarse, evenly spaced punctures.

There are two subspecies, differing in the extent of white marks on the abdomen, as follows:

1. Abdominal tergites 3 to 5 each with an ivory apical band or apicolateral pair of spots (fig. 186,e); range: Transcontinental in Canadian zone.
   4a. basalis heinrichi, new subspecies
   Abdominal tergites 3 to 5 entirely black; range: Austroriparian fauna.
   4b. basalis basalis Cresson

4a. Metopius (Tylopius) basalis heinrichi, new subspecies

FIGURE 186,e

Male: Black, the abdomen with a faint dark metallic blue tinge. Face, clypeus, more or less of cheek, interantennal process, under side of scape and pedicel, mouthparts, mark along upper edge of pronotum, subtegular ridge, large vertically oval spot on upper front

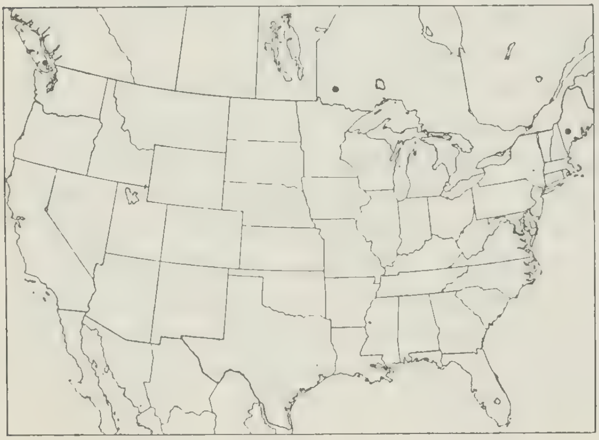


FIGURE 68.—Localities for *Metopius (Tylopius) basalis heinrichi.*

part of mesopleurum, tegula, basolateral appendage of scutellum, apex of scutellum (sometimes interrupted medially), apex of front and middle coxae in front, lateral stripe on middle coxa, trochanters except posterodorsally, front and middle femora except behind, front and middle tibiae except for a brown stripe behind, front and middle tarsi, all tibial spurs, basal 0.5 to 0.8 of hind femur in front, subapical spot on hind femur in front, most of hind tibia behind and below, under side of basal one or two segments of hind tarsus, apical 0.3± of first tergite but interrupted medially, apicolateral corners of second tergite, narrow apical band on third to fifth tergites (narrowed or interrupted medially or sometimes reduced to apicolateral corners), genitalia, much of subgenital plate, and broad apex of sternite in front of subgenital plate, white; under side of flagellum brown; wings subhyaline, tinged with brown.

Female: Black, the abdomen tinged with dark metallic blue. Margin of facial shield, space between facial shield and eye, interantennal process, side of face, small spot on under side of scape, mark along upper edge of pronotum, spot on subtegular ridge, apex of scutellum, stripe along upper front edge of front femur, front tibia except behind, front basitarsus except toward base and apex, second trochanter of middle leg in front, apex of middle femur in front, middle tibia except behind, middle basitarsus except above, hind first trochanter apically above, hind second trochanter except behind, basal half of hind femur in front, stripe on basal 0.4 of hind tibia in front, apical 0.4 of first tergite (interrupted in the middle), apical 0.2 of second tergite (interrupted in the middle), apical 0.15 of third and fourth tergites (narrowed medially), and apical 0.1 of fifth tergite, white; flagellum tinged with brown beneath; wings subhyaline, tinged with brown.

Type: ♀, Nerepis, N. B., August 22, A. G. Leavitt (Washington, USNM 63626).

Paratypes: ♂, Wellington, B. C., Sept. 27, 1946, R. Guppy (Townes). ♀, Dryden, Maine, Aug. 22, 1952, G. Heinrich (Heinrich). ♀, reared from Saturniidae, Vermillion Bay, Ont., emerged July 20, 1942 (Ottawa).

This subspecies is transcontinental in the Canadian zone.

4b. Metopius (Tylopius) basalis basalis Cresson

Metopius basalis Cresson, 1879, Trans. Amer. Ent. Soc., vol. 7, proc. p. xxvii; ♀. Type: ♀, Florida (Philadelphia).

?*Metopius medianus* Morley, 1912, A revision of the Ichneumonidae, based on the collection in the British Museum . . ., pt. 1, p. 78; ♂ (new synonymy). Type: ♂, Georgia (London).

Female: Black, the abdomen with a faint dark metallic blue tinge. Margin of facial shield, space between facial shield and eye, interantennal process, side of face, small spot on under side of scape, apicolateral corner of scutellum, subbasal stripe on front of middle tibia, front of second trochanter of hind leg, basal 0.7 of hind femur in front, apical 0.5 of first tergite, and apical 0.35 of second tergite (interrupted in the middle), white; flagellum tinged with brown beneath; wings infuscate. Described from the type of *M. basalis* (of which the front legs are missing).

The type of *Metopius medianus*, in London, was studied briefly but without the benefit of comparison material. It is close to *M. basalis basalis* but not certainly the same.

Specimen: ♀ (type of *basalis*), Florida (Philadelphia).

6. Subgenus Ceratopius

Figure 169,b

Ceratopius Clément, 1930, Konowia, vol. 8, p. 408. Type: *Metopius dissectorius* Panzer; original designation.

Facial shield escutcheon-shaped but rounded below, without a distinct basal point, its dorsal edge straight or weakly arcuate, its disc without a longitudinal carina; interantennal process narrowly triangular, its sides slightly raised, connected dorsally by a low ridge with a prominent acute horn in middle of frons; margin of clypeus broad and almost straight, not reflexed, close to base of labrum; mandible narrow, with two teeth, the lower tooth small and impressed; maxilla and labium short; temple weakly rounded; occipital carina rather close to foramen magnum, complete; prepectal carina turned sharply forward just above sternaulus almost to reach front edge of mesopleurum, then paralleling front edge of mesopleurum dorsad to near subtegular ridge; second recurrent vein with one bulla or rarely with two closely spaced bullae; hind femur about three times as long as deep; tarsal claws apparently simple; first tergite in profile sharply pyramidal, its dorsal face straight and somewhat elevated anteriorly, where it meets the flat dorsobasal face at an angle; male clasper depressed, with a lateral ridge.

This subgenus is predominantly Palaearctic. It does not occur in the New World. Clément (1930, Konowia, vol. 8, p. 408–430) describes eight Palaearctic species and one from Formosa. Additional representatives of the subgenus are: *Metopius* (*Ceratopius*) *metallicus* Michener, 1941, from China; *Metopius baibarensis* Uchida, 1930, from Formosa; *Metopius dissectorius trifasciatus* Uchida, 1930, from Japan and Korea (=*Metopius dissectorius imperfectus* Uchida, 1930, new synonymy); *Metopius dissectorius pieli* Uchida, 1940, from China; and *Metopius lar* Morley, 1912, from Sikkim. *Metopius lar* is a subspecies of *Metopius dissectorius* (new status).

7. Genus Triclistus

FIGURE 170,a

Triclistus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 161. Type: *Exochus podagricus* Gravenhorst; designated by Morley, 1913.

Front wing 3.3 to 6.7 mm. long; body punctation fine and weak; face and clypeus evenly convex, the face continued dorsally between antennal sockets as a triangle with an acuminate point which is continuous back between the antennae and to just below median ocellus as a high lamella, the lamella with a deep longitudinal groove in its dorsal edge, in profile the edge of the lamella arcuate; temple rather long and flat, sloping rather weakly inward to give the head a cubical appearance; head in profile flat or convex between hind ocellus and occipital carina; occipital carina strong and complete; cheek about 0.6 as long as basal width of mandible; mandible rather flat, tapered apically, its ventral tooth much shorter than its dorsal tooth; labrum weakly projecting, usually hidden under mandibles; flagellum moderately long, rather slender, not enlarged centrally or apically; upper margin of pronotum rather heavy, convex; propleurum weakly convex; scutellum weakly convex, without a lateral carina except at basolateral corner; areolet usually present, when present small and stalked above; nervulus postfurcal by 0.2 to 0.7 its length; nervellus broken below the middle, usually near its lower 0.2; prepectal carina strong, complete, dorsally meeting front end of subtegular ridge; sternaulus absent; metapleurum smooth, polished, impunctate and hairless, or with a few punctures and hairs; propodeum rather long, rather flat above, declivous at the posterior transverse carina, its carinae varying from all present and complete to almost entirely absent; propodeal spiracle subcircular to short oval; legs exceptionally stout; second trochanter of front and middle legs completely fused with its femur; middle tibial spurs approximately equal in length, the front spur the stouter; tarsal claws apparently simple; abdomen rather short, its first tergite usually broad basally, its spiracle near its basal 0.25, basally with two median longitudinal carinae; first sternite extending about 0.2 the length of its tergite; epipleura rather narrow; second tergite without dorsal carinae; first six tergites well exposed, the seventh tergite partly retracted in male, completely retracted in female, the following tergites completely retracted in both sexes; female subgenital plate elongate triangular, a little convex and upcurved, its apex more or less roundly notched.

Triclistus is worldwide in distribution and contains some very common species. They are small, stocky, and thick legged. The head and body are usually black, with legs usually fulvous (the coxae and trochanters black in some species), and wings hyaline. The head is nearly always entirely black. Many of the species are difficult to distinguish, and have very frequently been misdetermined. The keys and descriptions below are the best that we could devise, but are not adequate for distinguishing a large portion of the males, and an occasional female is not determinable with the known characters.

Keys to the Nearctic species of Triclistus

MALES

(Males of *Melanocephalus*, *chosis*, and *adustus* are unknown.)

1. Hind spur of hind tibia (including its hairs) about 3.0 as long as wide; punctures on face rather fine, separated by about 0.4 to 0.8 their diameter. Podagricus group 2

   Hind spur of hind tibia (including its hairs) about 4.0 to 5.0 as long as wide; punctures on face rather coarse, separated by about 0.25 to 1.0 their diameter. Crassus group 3

2. Hind coxa mostly blackish; third and fourth tergites with hairs medially (but not apically) . . . . **10. podagricus** (Gravenhorst)

   Hind coxa entirely ferruginous; third and fourth tergites without hairs medially . . . . **11. pallipes** Holmgren

3. Hind coxa black; costula present, at least as a stub. **2. brunnipes** (Cresson)

   Hind coxa fulvous or ferruginous 4

4. Costula complete; outer side of second lateral area of propodeum about 1.9 as long as inner side; tegula usually more or less fulvous, but sometimes entirely yellow . . . . **1. crassus,** new species

   Costula complete, incomplete, or absent, if complete the outer side of second lateral area of propodeum about 1.4 as long as inner side; tegula yellow.[1]
   3. emarginalus (Say)
   4. occidentis, new species
   5. rectus, new species
   6. evexus, new species
   8. propinquus, new species
   9. chosis, new species

FEMALES

1. Median third of fourth abdominal tergite with no hairs or with only a few scattered hairs (figs. 186,g,h); hind spur of hind tibia (including its hairs) about 2.8 to 3.8 as long as wide. Podagricus group 2

   Median third of fourth abdominal tergite with numerous, regularly spaced hairs (fig. 186,f); hind spur of hind tibia about 4.0 to 5.0 as long as wide. Crassus group 5

2. Body ferruginous; median longitudinal carinae of propodeum lacking except for short weak stubs basally and on apical transverse carina (fig. 187,k). **12. melanocephalus** (Cameron)

   Body black; median longitudinal carinae of propodeum distinct (figs. 187, i, and j) 3

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[1] We have not been able to make a clear separation between the males of these species, though with the aid of certain variable characters, distributional information, and associated females, one can determine some of the males with probably accuracy.

3. Hind coxa blackish or dark brown, paler apically; hairs on temple rather uniformly distributed . . . . **10. podagricus** (Gravenhorst)
Hind coxa uniformly fulvous; hairs on temple very sparse or absent centrally, denser near eye and occipital carina. (fig. 187,l) 4
4. First abdominal tergite about 1.2 as long as wide; median longitudinal carinae of propodeum very broad and blunt (fig. 187,i); fourth tergite with more hairs; front wing 5.0 to 6.1 mm. long . . . . . . **9. chosis,** new species
First abdominal tergite about 1.6 as long as wide; median longitudinal carinae of propodeum narrow and sharp (fig. 187,j); fourth tergite with fewer hairs; front wing 3.4 to 5.6 mm. long . . . . **11. pallipes** Holmgren
5. Last segment of hind tarsus with a small, subapical, ventral tooth or flange on inner side which is surmounted by a small apically projecting or curving tuft of hairs 6
Last segment of hind tarsus without a subapical ventral tooth, flange, or hair tuft 9
6. Subgenital plate rounded or weakly truncate apically; second segment of hind tarsus about 1.5 as long as wide. . . . . . . **6. evexus,** new species
Subgenital plate with a broad median notch apically; second segment of hind tarsus 2.0 to 2.5 as long as wide 7
7. Nervellus subvertical, broken at about its lower 0.35; hind coxa often blackish or dark brown . . . . **5. rectus,** new species
Nervellus strongly antefurcal, broken at about its lower 0.2; hind coxa fulvous, very rarely brownish 8
8. Second lateral area of propodeum defined, with its outer side about 1.9 as long as its inner side (fig. 187,a), with dense hairs; tegula usually fulvous. **1. crassus,** new species
Second lateral area of propodeum usually not defined, the costula being absent or very incomplete, when defined its outer side only about 1.4 as long as its inner side (fig. 187,c), its surface with rather sparse hairs; tegula yellow . . . . **3. emarginalus** (Say)
9. Hind coxa largely or entirely black or blackish 10
Hind coxa entirely fulvous 11
10. Hind femur ferruginous, or sometimes brownish but not darker than its tibia; second segment of hind tarsus about 2.1 as long as wide; apical notch in subgenital plate about 0.15 as deep as wide; median longitudinal carinae of propodeum somewhat incurved subbasally (fig. 187,b); front wing 4.5 to 6.5 mm. long. . . . . **2. brunnipes** (Cresson)
Hind femur brownish, darker than the hind tibia; second segment of hind tarsus about 2.8 as long as wide; apical notch in subgenital plate about 0.25 as deep as wide; median longitudinal carinae of propodeum straight (fig. 187,g); front wing 3.5 to 4.5 mm. long . . . **7. adustus,** new species
11. Costula absent or incomplete (fig. 187,d); hairs on hind tibia and tarsus of normal density and length, those on upper side of hind basitarsus about 0.35 as long as depth of basitarsus . . . . . . **4. occidentis,** new species
Costula complete and strong (fig. 187,h); hairs on hind tibia and tarsus exceptionally sparse and long, those on upper side of hind basitarsus about 0.75 as long as depth of basitarsus . . . . **8. propinquus** (Cresson)

I. CRASSUS GROUP

Punctures on face rather close and coarse, their interspaces usually about 0.3 their diameter; costula usually present, at least as a stub on lateral longitudinal carina; hairs on temple dense or moderately dense, regularly spaced; areolet usually narrower than in the *podagricus* group, sometimes absent; hind spur of hind tibia rather slender, together with its fringe of hairs about 4.0 to 5.0 as long as wide; last segment of hind tarsus of female with or without a small, ventral, subapical tooth or flange on inner side surmounted by a hair tuft; hairs on abdominal tergites rather dense and regularly arranged, though the basal three tergites with glabrous areas medially and the first tergite often mostly glabrous (fig. 186,f); fourth tergite almost or quite completely covered with moderately dense, regularly arranged hairs; apical notch of female subgenital plate usually weaker than in the *podagricus* group.

1. Triclistus crassus, new species

FIGURE 187,a

Front wing 4.4 to 6.3 mm. long; face weakly mat, its punctures rather coarse, separated by about 0.3 their diameter; temple of male moderately convex, with dense hairs; metapleurum with 10 to 40 hairs in male, with 0 to 20 hairs in female; median longitudinal carinae of propodeum moderately strong, sharp; areola rather regularly pentagonal but confluent with basal area, 0.5 as wide as basal area; costula complete or almost complete, sharp and usually rather strong; outer side of second lateral area of propodeum about 1.9 as long as inner side; hairs on second lateral area dense; areolet present; hind spur of hind tibia about 4.2 as long as wide; second segment of hind tarsus about 2.2 as long as wide in male, about 2.1 as long as wide in female; first tergite about 1.45 as long as wide in male, about 1.25 as long as wide in female, its dorsal carinae extending about 0.53 its length; first and second tergites a little more coriaceous than in other Nearctic *Triclistus*, especially in the male; last segment of hind tarsus of female with a very small subapical ventral tuft of hairs on inner side; apical notch of female subgenital plate about 0.15 as deep as wide.

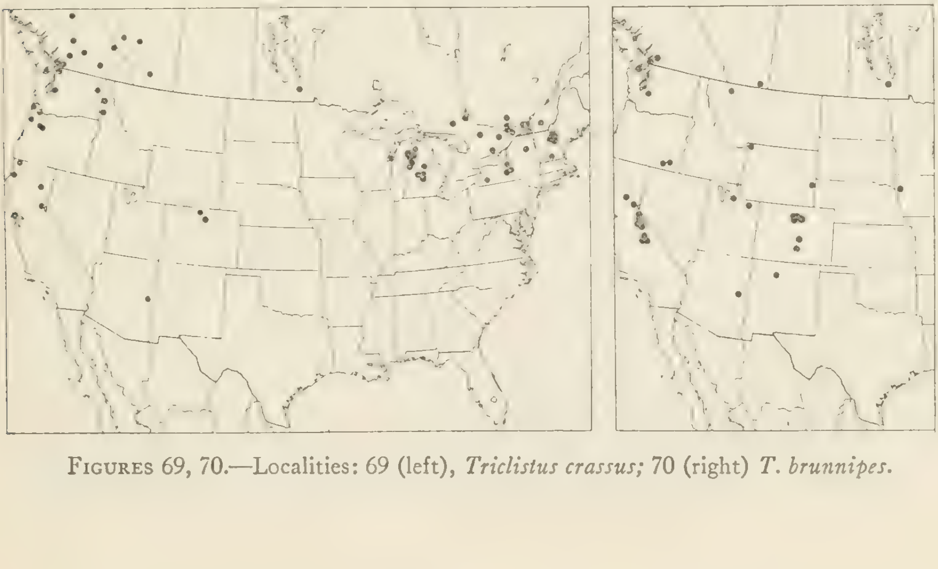
Black. Antenna blackish brown, paler brown below, paling to stramineous brown basally beneath; apical part of mandible ferruginous; palpi pale brown; tegula fulvous or sometimes pale yellow tinged with fulvous apically; legs fulvous.

Type: ♀, Muddy Pass, Colo., June 17, 1948, H., M., D., and J. Townes. (Washington, USNM 63627).

Paratypes (171♂, 40♀): From Alaska (Anchorage, Berg Bay, Dutch Harbor in Unalaska, King Salmon on the Naknek River, Mount McKinley at 1,600 ft., Popoff Island, Sitka, Virgins Bay, and Yakutat); Alberta (Banff, Cochrane, and Lethbridge); Arizona (near Alpine); British Columbia (Bear Mt., Clinton, Likely, North Bend, Robson, Vancouver, Vernon, Victoria, and Yoho Park); California (Eureka, Glen Alpine Creek near Tahoe, San Anselmo, Siskiyou Co., and Summit Camp in Lassen Co.); Colorado (Muddy Pass and Phantom Valley in Rocky Mountain National Park at 9,400 ft.); Idaho ("Cornwall," "Houser Lake," Moscow Mt., and Worley); Manitoba (Cedar Lake); Michigan (Charlevoix Co., Clinton Co., Grand Traverse Co., Gratiot Co., Kalkaska Co., Leelanau Co., Mecosta Co., Midland Co., Montcalm Co., Osceola Co., and Wexford Co.); New Hampshire (Bretton Woods, carriage road on Mount Washington, "Glen House," Jaffrey, and Randolph); New York ("Axton" in the Adirondack Mts., Cliff Mt. at 3,000 ft. in Essex Co., Ithaca, McLean Reserve in Tompkins Co., "Mt. Ivy," Rock City in Cattaraugus Co., and Syracuse); Ontario (Almonte, Brule Lake, Forbes, Jockvale, Merivale, Ottawa, Sudbury, and Trenton); Oregon (Cannon Beach, Cascadia, Corvallis, Portland, and Trout Creek Camp in Santiam Pass in Linn Co.); Prince Edward Island (Alberton); Quebec (Hemmingford, Hull, La Trappe, Montreal, Mount Lyall at 1,500 ft., Sherbrooke, and Wright); Washington (Bellingham, "Loon Lake," Spokane, and Swamp Creek in King Co.); Wisconsin (Door Co.); and Yukon (Dawson).

Nearly all the collection dates are in spring and early summer but a few are in August. The great majority of specimens seem to have originated from a single spring and early summer generation. Some of the August specimens are from far northern localities and seem still to represent the early season generation, but a few from more southern localities may have come from a partial second generation.

Early collecting dates and all collecting dates for August are as follows: April 11 at Portland, Oreg.; April 16 at San Anselmo, Calif.; April 17 at Eureka, Calif.; April 18 at Corvallis, Oreg.; May 6 at Bear Mt., B. C.; May 8 at Syracuse and Mt. Ivy, N. Y.; May 9 at Bellingham, Wash.; May 10 at Vernon, B. C.; May 14 at Forbes,



FIGURES 69, 70.—Localities: 69 (left), *Triclistus crassus;* 70 (right) *T. brunnipes.*

Ont.; May 15 in Midland Co., Mich.; August 1 at Mount Washington, N. H., and at Cornwall, Idaho; August 5 at Vancouver, B. C.; August 10 at 1,600 ft. at Mt. McKinley, Alaska, and at 1,500 ft. at Mount Lyall, Que.; August 12 at Banff, Alta.; and August 15 at Yoho Park, B. C.

This species is transcontinental in the Hudsonian and Canadian zones, and in the cooler part of the Transition zone. Adults occur mostly from the middle of May to late June.

2. Triclistus brunnipes (Cresson)

FIGURE 187,b

Exochus brunnipes Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, (1878), p. 374; ♀. Type: ♀, Nevada (Philadelphia).

Front wing 4.5 to 6.5 mm. long; face distinctly mat, with coarse punctures that are separated by about 0.4 their diameter; temple of male moderately convex, with moderately dense hairs; temple of female almost flat, with moderately dense hairs; metapleurum with 5 to 25 hairs in male, with 0 to 10 hairs in female; median carinae of propodeum sharp but rather weak; areola rather narrow, confluent with basal area, about 1.8 as wide as basal area; costula reduced to a short stub on lateral longitudinal carina; hairs in area of second lateral area of propodeum moderately dense; areolet present, or sometimes absent; hind spur of hind tibia about 4.7 as long as wide; second segment of hind tarsus about 2.1 as long as wide in male, about 1.9 as long as wide in female; first tergite about 1.25 as long as wide in male, about 1.35 as long as wide in female, its dorsal carinae extending about 0.55 its length; last segment of hind tarsus of female without a subapical, ventral flange, spine, or tuft of hairs on inner side; apical part of subgenital plate of female in side view unusually convex, its median apical notch about 0.15 as deep as wide.

Black. Palpi brown; tegula black to ferruginous; coxae black; trochanters ferruginous to black; legs beyond femora ferruginous or sometimes brownish ferruginous, the tarsi a little infuscate and femora (especially front femur) often blackish basally.

Specimens (106♂, 29♀): From Arizona (near Alpine); British Columbia (Steelhead, Wigwam Inn on Burrard Inlet, and Victoria); California (Alta Meadow at 9,000 ft. in Sequoia National Park, "Angora Peak" at 8,625 ft., Blanco's Corral at 10,000 ft. in the White Mts. of Mono Co., Echo Lake in Eldorado Co., near Glacier Point in Yosemite National Park, Gold Lake in Sierra Co., Kings River Canyon in Fresno Co., May Lake at 10,500 ft. in Yosemite National Park, White Chief near Mineralking at 9,000 ft., Snow Flat at 8,700 ft. in Yosemite National Park, near Sonora Pass at 8,500 ft., and Upper Echo Lake at 7,400 ft.); Colorado (Cascade Lodge in Rocky

Mountain National Park, near Estes Park, Florissant, Lyons, Phantom Valley at 9,400 ft. in Rocky Mountain National Park, and Westcliffe); Iowa (Sioux City); Manitoba (Churchill and Transcono); Montana (Lake Co.); Nevada; New Mexico (Jemez Springs); Oregon (Fish Lake at 7,000 ft. in the Steens Mts. and west side of the Steens Mts. at 6,000 ft.); Saskatchewan (Roche Percée); Utah (Duchesne River and Park City); Washington (Elbe); Wyoming (Canyon Camp in Yellowstone National Park and Jay Em); and Yukon (Whitehorse).

Most collecting dates are in June and July. Early and late collecting dates of interest are: May 5 at Victoria, B. C.; May 12, 13 and 17 at Sioux City, Iowa; May 18 in Lake Co., Mont.; May 28 near Alpine, Ariz.; June 1 at Steelhead, B. C.; August 2 at Cascade Lodge in Rocky Mountain National Park, Colo.; August 4 at Canyon Camp, Yellowstone National Park, Wyo.; August 7 at Whitehorse, Yukon; August 13 at Elbe, Wash.; and September 4 at Wigwam Inn, Burrard Inlet, B. C.

This species is widespread in the Canadian and Hudsonian zones in the western half of North America. Adults occur mostly in June and July.

3. Tricistus emarginalus (Say), new combination

FIGURES 186,f; 187,c

Exochus emarginalus Say, 1829, Contrib. Maclurean Lyceum Arts Sci., vol. 1, p. 76 (Leconte ed., vol. 1, p. 380). Type: Indiana (destroyed).

Exochus fulvipes Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 285; ♂, ♀ (new synonymy). Lectotype: ♀, Pennsylvania (Philadelphia).

Front wing 3.3 to 5.7 long; face mat, its punctures of moderate size, separated by about 0.6 their diameter; male temple moderately convex, with dense hairs; female temple weakly convex, its hairs dense and evenly distributed; metapleurum with 0 to 10 hairs; median longitudinal carinae of propodeum strong but rather blunt; areola about 1.4 to 1.8 as wide as basal area, with which it is gradually confluent; costula usually present only as a triangular stub on lateral longitudinal carina but sometimes almost or quite complete, when complete weaker than median longitudinal carinae; second lateral area of propodeum, when defined, with outer side about 1.4 as long as inner side; hairs in area of second lateral area of propodeum rather sparse; areolet usually present; hind spur of hind tarsus (including its hairs) about 4.5 as long as wide; second segment of hind tarsus about 2.35 as long as wide; first tergite about 1.25 as long as wide, its dorsal carinae extending about 0.53 its length; last segment of hind tarsus with a very small to rather large, ventral, subapical flange or tooth on the inner side that is surmounted by a hair tuft; notch in apex of subgenital plate about 0.2 as deep as wide.

Black. Antenna brown above, pale brown beneath, stramineous beneath basally; apical part of mandible ferruginous; palpi stramineous; tegula pale yellow; legs fulvous, the tibiae basally and the tarsi usually a little paler than the rest of the legs.

Specimens from west of the 100th meridian tend to have the legs a little darker fulvous and the costula averaging a little stronger than in specimens from east of that meridian.

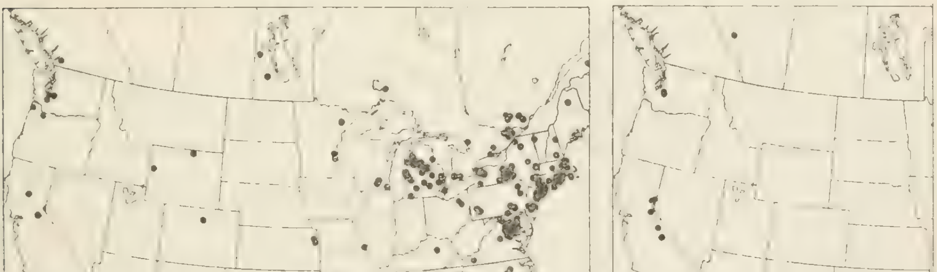
The type of *Exochus emarginalus* Say is destroyed. Its original description fits perfectly members of the present species lacking the areolet. It fits also other species of *Triclistus* with similar coloration and lacking the areolet, but since this species is the commonest in the type locality, the name is applied here. The lectotype of *E. fulvipes* Cresson is peculiar in that the propodeum is entirely without carinae basad of the apical transverse carina, but agrees in other respects with the present species; it is believed to be an abnormal individual.

Specimens (413♂, 248♀): from Alabama (Coleta, Langdale, Mobile, and Pyriton); Alberta (Edmonton); British Columbia (Steelhead); California (Camino and Chico); Colorado (near Estes Park); Connecticut (Canterbury, Lebanon, North Stonington, and Wallingford); Florida; Kansas (Baldwin City and Lawrence); Kentucky (Lexington); Maine (Capens and Lincoln Co.); Manitoba (Birch River and Riding Mt. Park); Maryland (Bowie, Cabin John, Glen Echo, Plummers Island, Roland Park, Silver Spring, and Takoma Park); Massachusetts (Auburndale, Holliston, Milton, Petersham, Rockport, South Hadley, and Woods Hole); Michigan (Bay Co., Calhoun Co., Cass Co., Clare Co., East Lansing, George Reserve in Livingston Co., Grand Traverse Co., Iosco Co., Isabella Co., Kent Co., Macomb Co., Manistee Co., Midland Co., Missaukee Co., Muskegon Co., Oakland Co., Oceana Co., Osceola Co., Saginaw Co., and St. Clair Co.); Missouri (Kirwood); Minnesota (Newport, Ramsey Co., and Virginia); New Hampshire (Concord and Pinkham Notch); New Jersey (Essex Co., Moorestown, New Brunswick, Riverton, and Summit); New Mexico (Jemez Springs at 6,400 ft.); New York (Aurora, Babylon, Barrytown, Bemus Point, Big Indian Valley in the Catskill Mts., Canton, Canajoharie, Corning, Cranberry Lake, East Aurora, Ellis Hollow, Farmingdale, Ithaca, Lake Sebago in Bear Mt. Park, Lancaster, McLean Reserve in Tompkins Co., North Evans, Orient, Poughkeepsie, Sea Cliff, Shokan, Syracuse, Troy, Van Courtland Park, and West Nyack); North Carolina (Clingman's Dome at 6,600 ft., Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Forney Ridge on Andrews Bald in Great Smoky Mountains National Park, Hamrick, Highlands, Marshall, Mount Mitchell, Mount Pisgah at 5,000 to 5,749 ft., Rocky Mount, Southern Pines, Tryon, and

Wake Co.); Ohio (Akron and Summit Co.); Ontario (Bells Corners, Brighton, Constance Bay, Ingersoll, Leamington, Macdiarmid on Lake Nipigon, Ottawa, Stamford, Strathroy, Tweed, Vineland Station, and Waubamick); Oregon (Cannon Beach and Gresham); Pennsylvania (Allegheny Co., Arendtsville, Enola, Harrisburg, Lehigh Gap, "New Cumberland," Philadelphia, Spring Brook, and Westmoreland Co.); Prince Edward Island (Brackley Beach and Dalvay House, both in Canadian National Park); Quebec (Aylmer, Burbridge, Cascapedia River, Clement, Kazubazua, Lac Mercier, Mount Lyall at 1,500 ft., and Sainte Agathe des Montes); Rhode Island (Buttonwoods, Hopkington, Kingston, and Westerly); South Carolina (Columbia, Greenville, Mountain Lake in Greenville Co., and near Tigerville); Vermont (South Hero); Virginia ("Camerons Mills," Chain Bridge, Charlottesville, Arlington, Falls Church, Galax, Great Falls, Herndon, Rosslyn, and Vienna); Washington (Ashford, Morton, and Mount Rainier); West Virginia (Bolivar and Kearneysville); Wisconsin (Columbus, Madison, and Muskego); and Wyoming (Hoback in Teton Co. at 6,500 ft. and mountains near Sheridan).

Most specimens were collected during June, July, and August, but there are also many records as early as May 15 and as late as October 15, and a few outside of this range.

Early and late collection dates of interest are April 1 at Kirkwood, Mo.; April 16 at Takoma Park, Md., and at Southern Pines, N. C.; April 17 at Vienna, Va.; April 20 in Wake County, N. C.; April 23 at Wallingford, Conn.; May 9 at Takoma Park, Md; May 10 at Rosslyn, Va., and at Tryon, N. C.; May 11 at New Cumberland, Pa.; May 13 at Aurora, N. Y.; May 15 at South Hadley, Mass.; May 18 at Akron, Ohio; Sept. 7 at Ithaca, N. Y.; Oct. 9 at Takoma Park, Md., and at Bowie, Md.; Oct. 11 at Falls Church, Va.; Oct. 13 at Plummers Island, Md., and at Highlands, N. C.; Oct. 14 at Morton, Wash.; Oct. 18 at



FIGURES 71, 72.—Localities: 71 (left), *Triclistus emarginalus*; 72 (right), *T. occidentis*.

Kirkwood, Mo.; Oct. 19 at Charlottesville, Va.; Oct. 20 at Takoma Park, Md.; and Nov. 7 at Arlington, Va.

Rearing records associated with these specimens are: ♀, from *Argyrotaenia velutinana*, Arendtsville, Pa., June 5, 1921, S. W. Frost. 3♀, from *Argyrotaenia velutinana*, Wallingford, Conn., Apr. 23, 1921, and May 20 and 23, 1920, B. A. Porter. ♀, from *Argyrotaenia velutinana*, "Camerons Mills," Va., Aug. 7, 1900. 4♀, from *Argyrotaenia velutinana*, Kearneysville, W. Va., June and August 1955, D. W. Clancy. 9♂, from *Anthophila pariana*, Wallingford, Conn., June 17, 26, and 28, 1922, and Aug. 6, 7, 14, and 15, 1922, B. A. Porter. ♂, from *Tortrix*, Kirkwood, Mo., Oct. 18, 1881, M. E. Murtfeldt. ♂, from Tortricidae, Apr. 2, 1944, W. R. M. Mason collection. ♀, from *Tetralopha robustella*, July 22, 1934. ♀, from *Phlyctaenia extricalis*, Herndon, Va., August 30, J. F. Strauss. 3♀, from *Tholeria reversalis*, Aug. 5, 1890. ♂, from *Bucculatrix* sp. on *Solidago*, Kirkwood, Mo., May 15, 1885, M. E. Murdtfelt. ♂, from larva on *Betula alba*, Essex County, N. J., July 6, 1902, W. D. Kearfott. ♀, from pyralid, C. V. Riley collection. ♀, from pyralid on *Alnus incana*. ♂, from pyralid pupa, Silver Spring, Md., May 31, 1938. ♀, from *Arundinaria*, Mobile, Ala., Dukes collection. ♀, from lepidopterous pupa on grass, Falls Church, Va., June 25, 1918, R. A. Cushman. 2♀, from skeletonizer larva, Morton, Wash., collected Sept. 20, 1954, emerged Oct. 12 and 19, 1954, Carl Johnson.

In our experience, the species occurs mostly in deciduous woods, flying in semishade and rather low, often over dead leaves or dead fallen branches. Not infrequently it is the commonest ichneumonid to be found.

This species is transcontinental in deciduous woods, but it is commoner in the East. Adults occur from mid-spring to mid-fall.

4. Triclistus occidentis, new species

FIGURE 187,d

Male: Not known with certainty.

Female: Front wing 3.3 to 5.5 mm. long; face weakly mat, its punctures coarse, their interspaces about 0.3 their diameter; temple weakly convex, its hairs moderately dense, evenly distributed; metapleurum with 0 to 15 hairs; median longitudinal carinae of propodeum strong but rather blunt; areola narrowly pentagonal, gradually confluent with basal area; costula present as a stub on lateral longitudinal carina; hairs in area of second lateral area of propodeum rather sparse; areolet absent, or present; hind spur of hind tibia (including its hairs) about 4.9 as long as wide; second segment of hind tarsus about 2.8 as long as wide; first tergite about 1.30 as long as wide, its dorsal carinae extending about 0.45 its length; last segment of hind tarsus without a subapical ventral tooth or tuft of hairs on inner side; apical notch of subgenital plate weak, about 0.12 as deep as wide.

Black. Flagellum dark brown, paling to stramineous brown basally beneath; apical half of mandible mostly ferruginous; palpi stramineous brown; tegula pale yellow; legs fulvous.

Type: ♀, Yosemite Valley, Calif., July 13, 1948, H., M., G., D., and J. Townes (Washington, USNM 63628).

Paratypes: 8♀, same data as type (Townes). ♀, Banff, Alta., Sept. 5, 1922, C. B. D. Garrett (Ottawa). ♀, Boca, Calif., June 28, 1954, R. M. Bohart (Davis). 2♀, Camino, Calif., June 30, 1948, H., M., G., and D. Townes (Townes). ♀, Donner Pass, Calif., Aug. 1, 1948, H., M., G., D., and J. Townes (Townes). ♀, Sequoia National Park, "Ash Mt. R," Apr. 27, 1950, E. I. Schlinger (Davis). 3♀, Mount Rainier at 5,000 and 5,700 ft., Wash., July 8 and 9, 1940, H. and M. Townes (Townes). ♀, White River, Mount Rainier, Wash., July 20, 1924 (Cambridge).

This species occurs in Alberta, Washington, and California, in the Hudsonian to Transition zones.

5. Triclistus rectus, new species

FIGURE 187,e

Male: Unknown.

Female: Front wing 3.7 to 4.7 mm. long; face weakly mat, its punctures coarse, separated by about 0.3 their diameter; temple weakly convex, its hairs moderately dense, evenly spaced; metapleurum with 3 to 12 hairs; median longitudinal carinae of propodeum moderately strong and sharp; areola rather narrowly pentagonal, broadly confluent with basal area; costula present as a stub on lateral longitudinal carina; hairs in area of second lateral area of

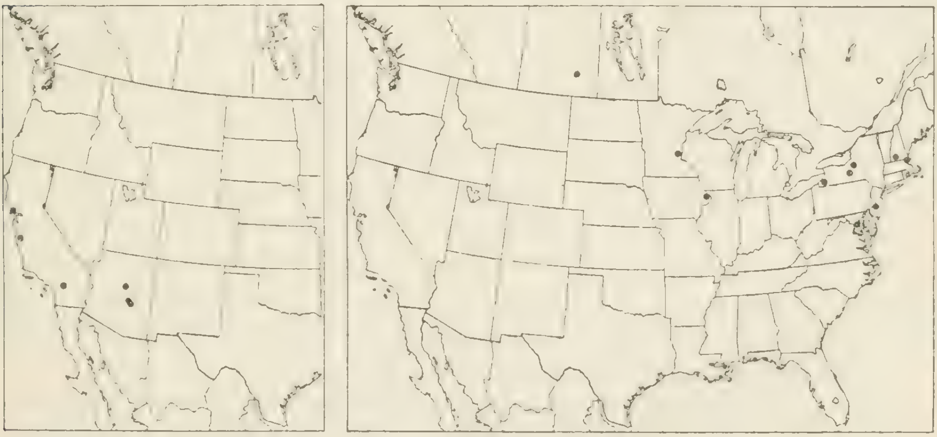


FIGURE 73, 74.—Localities: 73 (left), *Triclistus rectus;* 74 (right), *T. evexus.*

propodeum rather sparse; areolet usually present; nervellus subvertical, broken near its lower 0.35 (nervellus strongly antefurcal and broken near its lower 0.2 in all the other Neartic species); hind spur of hind tibia (including its hairs) about 4.4 as long as wide; second segment of hind tarsus about 2.25 as long as wide; first tergite about 1.15 as long as wide, its dorsal carinae extending only about 0.34 its length; last segment of hind tarsus with a small, ventral, subapical tuft of hairs on inner side, surmounting a small tooth or flange; notch in apex of subgenital plate weak, about 0.12 as deep as wide.

Black. Antenna dark brown, paler beneath, especially basally; apical half of mandible largely ferruginous; palpi pale brown; tegula pale yellow; legs fulvous, the coxae ranging from fulvous to dark brown with paler apices.

Type: ♀, Parker Creek, Sierra Ancha, Ariz., May 7, 1947, H. and M. Townes (Washington, USNM 63629).

Paratypes: 2♀, Oak Creek Canyon, Ariz., May 20, 1947, H. and M. Townes (Townes). 2♀, Workman Creek, Sierra Ancha, Ariz., May 3 and 8, 1947, H. and M. Townes (Townes). ♀, Bradley, Calif., Apr. 15, 1952, W. H. Lange (Davis). ♀, Idyllwild, San Jacinto Mts., Calif., May 26, 1939, E. S. Ross (Townes). ♀, Ross, Calif., Apr. 25, 1952, H. L. Mathis (Davis).

6. Triclistus evexus, new species

Figure 187,f

Front wing 5.0 to 6.7 mm. long; face moderately mat, its punctures coarse, separated by about 0.3 their diameter; temple weakly convex, its hairs dense and evenly spaced; metapleurum with 8 to 20 hairs in male, with 0 to 5 hairs in female; median longitudinal carinae of propodeum very broad and blunt; areola rather wide, very broadly confluent basally with basal area; costula represented by a stub on lateral longitudinal carina or complete, when complete weak; second lateral area of propodeum, when defined, 1.7 as long on its outer side as on its inner side; hairs on area of second lateral area rather sparse; areolet usually present; hind spur of hind tibia (including its hairs) about 4.0 as long as wide; second segment of hind tarsus about 2.1 as long as wide in male, about 1.5 as long as wide in female; first tergite about 1.18 as long as wide, its dorsal carinae extending about 0.40 its length; last segment of hind tarsus in female with a small, ventral, subapical tuft of hairs on inner side, surmounting a small tooth or flange; apex of female subgenital plate parabolically rounded or somewhat truncate, not distinctly notched.

Black. Antenna brown, paler beneath, especially basally; mandible ferruginous, fuscous basally; palpi stramineous; tegula pale yellow; legs fulvous.

Type: ♀, Bemus Point, N. Y., July 25, 1937, H. Townes (Washington, USNM 63630).

Paratypes: 6♀, Colo., C. F. Baker (Washington and Townes). ♀, Clinton County, Iowa, July 9, 1952, J. C. Schaffner (Washington). ♀, Takoma Park, Md., Aug. 19, 1943, H. and M. Townes (Townes). ♀, Lexington, Mass., June 27, N. Banks (Cambridge). 23♂, reared from *Archips cerasivorana*, Ramsey County, Minn., July 12 to 25, 1932, C. H. Hoffman (St. Paul, Washington, and Townes). ♀, reared from *Acrobasis comptoniella*, Keene, N. H., Aug. 8, 1940 (Washington). ♀, Moorestown, N. J., July 26, 1939, H. and M. Townes (Townes). ♀, Ithaca, N. Y., June 2, 1936, H. Townes (Townes). ♀, Syracuse, N. Y., May 30, 1938, H. and M. Townes (Townes). ♀, reared from *Archips cerasivorana*, Indian Head, Sask., July 11, 1941 (Ottawa).

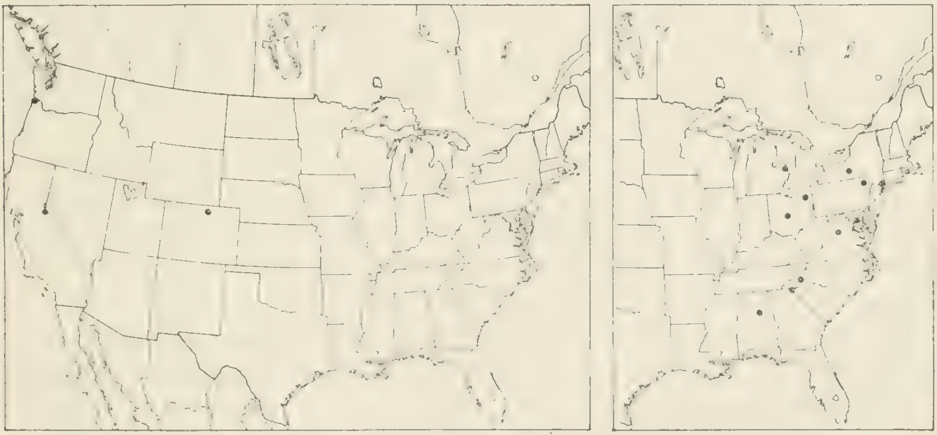
This species occurs in the Alleghenian fauna.

7. Triclistus adustus, new species

Figure 187,g

Male: Unknown.

Female: Front wing 3.5 to 4.5 mm. long; face rather strongly mat, its punctures small, their interspaces about 1.0 their diameter; temple almost flat, its hairs dense, evenly spaced; metapleurum with 0 to 5 hairs; median longitudinal carinae of propodeum sharp, straight, convergent anteriorly; costula completely absent; hairs on area of second lateral area of propodeum rather dense; areolet present; hind spur of hind tibia (including its hairs) about 4.5 as long as wide; second segment of hind tarsus about 2.8 as long as wide; first tergite about 1.35 as long as wide, its dorsal carinae extending about 0.47 its length; last segment of hind tarsus without a subapical ventral



Figures 75, 76.—Localities: 75 (left), *Triclistus adustus;* 76 (right), *T. propinquus.*

tooth or tuft of hairs on inner side; apical notch of subgenital plate about 0.25 as deep as wide.

Black. Antenna dark brown, paler basally beneath; apical half of mandible reddish brown; palpi stramineous; tegula pale yellow, often partly tinged with fulvous, legs dark to medium brown, the tibiae and tarsi pale brown.

Type: ♀, Dardanelle, Calif., July 8, 1948, H., M., G., D., and J. Townes (Washington, USNM 63631).

Paratypes: ♀, foothills west of Fort Collins, Colo., June 20, 1896, C. F. Baker (Washington). ♀, "Forresters at 8,500 ft.," Colo., July 19, 1895, C. F. Baker (Washington). ♀, Seaside, Oreg., Aug. 7, 1940, H. and M. Townes (Townes).

8. Triclistus propinquus (Cresson)

Figure 187,h

Exochus propinquus Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 114; ♂, ♀. Lectotype: ♀, Connecticut (Philadelphia).

Male: Not known with certainty.

Female: Front wing 5.3 to 6.6 mm. long; face rather strongly mat, its punctures moderately coarse, their interspaces about 0.3 their diameter; temple flat, its hairs rather long and sparse, evenly spaced; last segment of maxillary palpus about 4.5 as long as wide (which is a little longer than usual for the genus); metapleurum with 0 to 5 hairs; median longitudinal carinae of propodeum heavy; areola elongate pentagonal, narrowly confluent with basal area or separated from basal area by approximation of the median longitudinal carinae; costula complete, always as strong as median longitudinal carinae; hairs on second lateral area of propodeum rather sparse; areolet usually absent; hairs on hind tibia and tarsus definitely sparser and longer than in other Nearctic species of *Triclistus*, the hairs on upper side of hind basitarsus about 0.75 as long as depth of the basitarsus (about 0.35 as long as depth of the basitarsus in the other Nearctic species); hind spur of hind tibia (including its hairs) about 4.8 as long as wide; second segment of hind tarsus about 2.8 as long as wide; first tergite about 1.35 as long as wide, its dorsal carinae extending about 0.54 its length; last segment of hind tarsus without a subapical ventral projection or tuft of hairs on inner side; apical notch of subgenital plate about 0.15 as deep as wide.

Black. Antenna dark brown, paler below, especially basally; apical half of mandible ferruginous; palpi pale stramineous; tegula pale yellow; legs fulvous.

Specimens: ♀, Coleta, Ala., H. H. Smith (Washington). ♀ (type), Conn. (Philadelphia). ♀, Neel Gap, Rabun Co., Ga., May 22, 1946, P. W. Fattig (Washington). 3♀, Takoma Park, Md., May 24, 1942, June 13, 1942, and June 13, 1943, H. and M. Townes (Townes). ♀, Sanilac Co., Mich., May 30, 1952, R. R. Dreisbach (Dreisbach). 4♀, Ithaca, N. Y., May 23, 1936, and June 2 and 6, 1936, H. Townes (Townes). ♀, West Nyack, N. Y., June 5, 1938, A. L. Melander (Cambridge). 2♀, North Fork of Swannanoa River, Black Mts., N. C., May, N. Banks (Cambridge). ♀, Akron, Ohio, May 18, 1941, H. Townes (Townes). ♀, Columbus, Ohio, May 19, 1941, G. R. Ferguson (Corvallis). 6♀, Spring Brook, Pa., May 22 and 25, 1945, and June 8, 12, and 13, 1945, H. Townes (Townes). ♀, Dayton, Va., June 13, 1931 (Pittsburgh). ♀, June 19, 1895 (Ottawa).

This species occurs in deciduous woods in the East. Adults have been collected from May 22 to June 19.

II. PODAGRICUS GROUP

Punctures on face usually rather fine and distant, their interspaces usually about 0.4 to 0.8 their diameter; costula completely absent; hairs on temple dense to sparse, often with irregular spacing that leaves small glabrous areas medially (fig. 187,l); areolet usually wider than in *crassus* group, always present; hind spur of hind tibia rather short and stout, together with its fringes about 0.28 to 0.38 as long as wide; last segment of hind tarsus of female with a small, ventral, subapical, tooth or flange on inner side that is surmounted by a hair tuft; hairs on abdominal tergites of male dense to sparse, more or less regularly arranged but the basal tergites glabrous medially and first tergite mostly glabrous; hairs on abdominal tergites of female always sparse, the tergites always glabrous or subglabrous medially but often with numerous hairs laterally, the fourth tergite always with its median third glabrous or with a very few scattered hairs (figs. 186,g,h); apical notch of female subgenital plate strong.

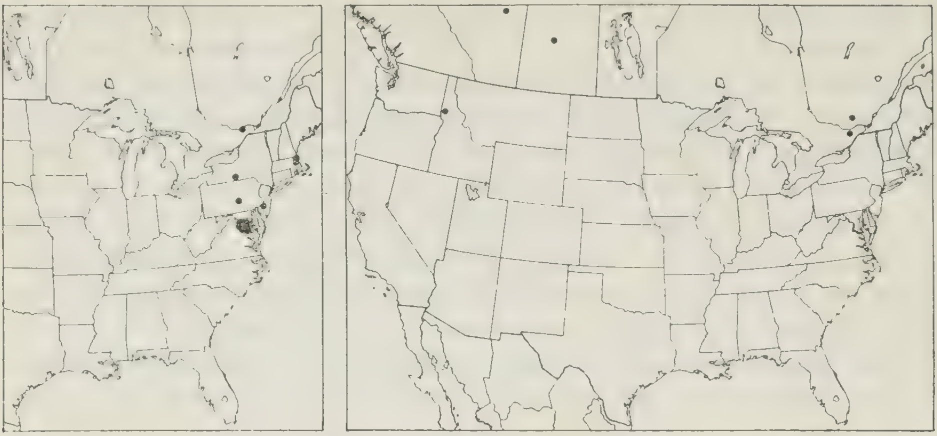
We have species of this group from Madagascar (including *T. traditor* Seyrig and *T. inimicus* Seyrig), Eurasia, Japan, Formosa, South America, and there are the three Nearctic species treated below.

9. Triclistus chosis, new species

FIGURES 186,g; 187,i,l

Male: Not known with certainty.

Female: Front wing 5.0 to 6.1 mm. long; face mat, its punctures moderately coarse, their interspaces about 0.4 their diameter; temple flat, its hairs long, rather dense next to eye and occipital carina, elsewhere sparse and scattered; metapleurum with 0 to 7 hairs; median longitudinal carinae of propodeum very wide but not sharp, widely spaced, subparallel but somewhat convergent subbasally; hairs on area of second lateral area of propodeum sparse; median apical area of propodeum about 0.33 as long as wide; hind spur of hind tibia about



Figures 77, 78.—Localities: 77 (left), *Triclistus chosis*, 78; right, *T. podagricus.*

3.5 as long as wide; second segment of hind tarsus about 2.4 as long as wide; first tergite about 1.2 as long as wide, its dorsal carinae extending about 0.55 its length; hairs on abdominal tergites rather long, present on the following areas: apical lateral part of first tergite, second tergite except for median 0.3, third and fourth tergites except for large median area which is narrow basally and broad apically, and fifth tergite laterally; apical notch in subgenital plate about 0.45 as deep as wide.

Black. Mandible light brown, blackish basally; palpi stramineous; antenna brown, darker apically and paler basally beneath; tegula pale yellow, tinged with fulvous apically; legs fulvoferruginous.

Type: ♀, Takoma Park, Md., June 20, 1943, H. and M. Townes (Washington, USNM 63632).

Paratypes: 2♀, Georgetown, D. C., H. H. Smith (Washington). ♀, Washington, D. C., October 1922, E. A. Schwartz (Washington). ♀, Bowie, Md., July 26, 1947, H. and M. Townes (Townes). ♀, Cabin John, Md., Aug. 4, 1917, Fouts (Washington). 2♀, Plummers Island, Md., Aug. 8 and 25, 1943, R. H. Beamer (Lawrence). ♀, Plummers Island, Md., Sept. 12, 1912, H. S. Barber (Washington). 5♀, Takoma Park, Md., Aug. 3, 12, 22, and 26, 1943, and Sept. 10, 1943, H. and M. Townes (Townes). ♀, Arnold Arboretum, Boston, Mass., July 23, 1921, Harold Morrison (Washington). ♀, reared from *Desmia funeralis*, Wakefield, Mass., July 5, 1932 (Washington). 2♀, Moorestown, N. J., July 23, 1939, H. and M. Townes (Townes). ♀, Elmira, N. Y., Aug. 4, 1937, H. Townes (Townes). ♀, Ottawa, Ont., July 26, 1947, W. R. M. Mason (Ottawa). ♀, Harrisburg, Pa., June 28, 1908, P. R. Myers (Washington). ♀, reared from *Sylepta obscuralis*, Arlington, Va., June 1921 (Washington). ♀, "Pimmit Run," Va., Sept. 6, 1908, F. Knab (Washington). ♀, Virginia, August 1939 (Townes).

This species occurs in the Carolinian fauna. Adults have been collected from June 20 to September 12.

10. Triclistus podagricus (Gravenhorst)

FIGURE 170,a

Exochus podagricus Gravenhorst, 1829, Ichneumologia europaea, vol. 2, p. 336; ♂, ♀. Lectotype (hereby designated): ♀, without locality data but presumably from either Paris or Sickershausen (Wroclaw).

Front wing 3.8 to 4.7 mm. long; face rather strongly mat, its punctures small and separated by about 0.8 their diameter; temple of male moderately convex, its hairs moderately dense, evenly spaced; temple of female weakly convex, a little more bulging above than in *T. pallipes;* hairs on temple moderately long, rather sparse, and evenly spaced; metapleurum of male with 0 to 12 hairs, of female with no hairs; median longitudinal carinae of propodeum sharp, somewhat divergent at position of costula (which is absent) and convergent subbasally; hairs in area of second lateral area of propodeum rather dense; median apical area of propodeum about 0.50 as long as wide; hind spur of hind tibia about 3.0 as long as wide; second segment of hind tarsus about 3.1 as long as wide in male, about 2.7 as long as wide in female; first tergite about 1.5 as long as wide, its dorsal carinae extending about 0.50 its length; male with first five tergites bare on apical 0.2±, on base and center of first tergite, and on median part of second tergite, the rest with rather evenly spaced hairs of moderate length; tergites of female with hairs about as in female of *T. pallipes* but with bare central area of third and fourth tergites somewhat less extensive; apical notch of female subgenital plate about 0.4 as deep as wide.

Black. Antenna brown, paler basally beneath; mandible dark brown, blackish basally; palpi light brown; tegula pale fulvous; legs brownish fulvous, the hind coxa dark brown except apically and the middle coxa more or less brownish. The femora are a little darker than the tibiae. Sometimes the hind femur is distinctly infuscate. In specimens from Europe the legs, mouth parts, and tegula average a little darker than in specimens from North America.

Specimens: ♀, Skagway, Alaska, May 22, 1923, J. A. Kusche (San Francisco). ♂, White Pass Trail, Skagway, Alaska, May 5, 1923, J. A. Kusche (San Francsico). ♂, Edmonton, Alta., Apr. 21, 1943, W. R. M. Mason (Ottawa). ♀, Moscow Mt., Idaho, June 17, A. L. Melander (Cambridge). ♀, Kentville, N. S., June 3, 1924, R. P. Gorham (Ottawa). ♀, Almonte, Ont., May 19, 1941, G. S. Walley (Ottawa). ♀, Kazubazua, Que., May 28, 1933, G. S. Walley(Ottawa). ♀, Sydney, N. S., "8-6-01" (Ottawa). 3♀, Saskatoon, Sask., May 16, 1924, Kenneth M. King (Ottawa). 3♀, no data (Ottawa). 3♂, 3♀ from Ireland, Sweden, and Belgium (Townes).

This species is transcontinental in the Canadian zone and it occurs also in northern Europe. Most specimens have been collected in spring.

11. Triclistus pallipes Holmgren

FIGURES 186,h; 187,j

Triclistus pallipes Holmgren, 1873, Öfvers. Svenska Vetensk. Akad. Förh., vol. 30, p. 59; ♀. Types: ♀♀, "Wermelandia et Norvegia" (Stockholm).

Exochus pygmaeus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 285; "♂"=♀ (new synonymy). Type: ♀, Illinois (Philadelphia).

Front wing 3.4 to 5.6 mm. long; face rather strongly mat, its punctures small, their interspaces about 0.8 their diameters; temple of male moderately convex, its hairs moderately dense, evenly spaced; temple of female almost flat and above not bulging as in *T. podagricus*, its hairs numerous next to eye and occipital carina, elsewhere sparse and irregularly spaced, absent in median areas; metapleurum of male with 1 to 15 hairs, of female with 0 to 3 hairs; median longitudinal carinae of propodeum sharp but not particularly strong, divergent at position of costula (which is absent), convergent subbasally; hairs on area of second lateral area of propodeum sparse; median apical area of propodeum about 0.50 as long as wide; hind spur of hind tibia about 3.0 as long as wide; second segment of hind tarsus about 3.1 as long as wide in male, about 2.7 as long as wide in female; first tergite unusually convex, about 1.5 as long as wide in male, about 1.6 as long as wide in female, its dorsal carinae extending about 0.50 its length; tergites of male medially bare on the basal 4 tergites, laterally with rather long hairs, the hairs progressively more numerous toward apical tergites, beyond fourth or fifth tergite without median hairless area; tergites of female bare, laterally with scattered short hairs which are progressively more numerous towards apex of abdomen, and often with a very few discal hairs; apical notch of female subgenital plate about 0.4 as deep as wide.

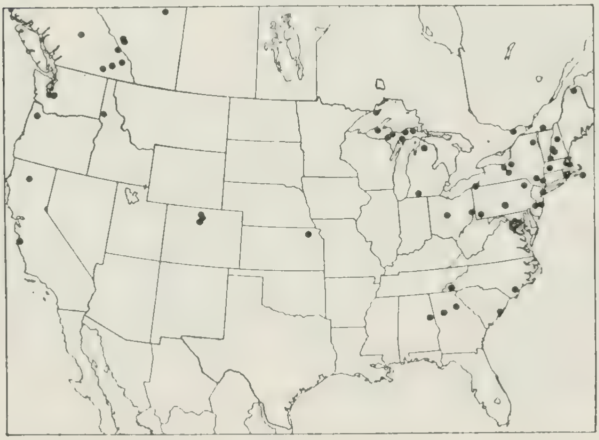


FIGURE 79.—Localities for *Triclistus pallipes*.

Black. Antenna brown, darker apically and stramineous basally beneath; mandible brown, infuscate at base; palpi stramineous; tegula yellow; legs fulvous.

Specimens (20♂, 129♀): From Alabama (Pyriton); Alaska (King Salmon on the Naknek River, Matanuska, Mile 149 on Richardson Highway, and Skagway); Alberta (Banff, Edmonton, Norquay Meadows near Banff at 5,000 to 6,000 ft., and Slave Lake); British Columbia (Canim Lake, Carbonate on the Columbia River at 2,600 ft., Kaslo, Robson, and Field in the Rocky Mts. at 4,800 ft.); California (Carmel, "Mirror Lake at 4,096 ft.," and Summit Lake in Shasta Co.); Colorado (near Estes Park, Phantom Valley in Rocky Mountain National Park at 9,400 ft., and Pingree Park); District of Columbia (Georgetown); Georgia (Athens and Atlanta); Idaho (Moscow Mt.); Kansas (Onaga); Maine (Eastport, Fort Kent, and "Pittston"); Maryland (Bowie, Cabin John, Glen Echo, and Takoma Park); Massachusetts (Blue Hills, Chester, Milton, Nantucket, and Wellesley); Michigan (Alger County, Cheboygan Co., Delta Co., Dickinson Co., Houghton Co., Isle Royale, Luce Co., Marquette Co., and Nottawa); New Hampshire (Cornish, Hanover, and Mount Washington); New Jersey (Lakehurst and Moorestown); New York (Flatbush, Ithaca, Onondaga Co., Poughkeepsie, Shokan, Spring Lake in Cayuga Co., and Wilmington); North Carolina (Nantahala Gorge at 2,000 ft. and Willard); Nova Scotia (Baddeck, Grand River, and Ingonish); Ohio (Delaware Co. and Stubenville); Ontario (Ottawa); Oregon (McMinnville); Pennsylvania (Lawrence, North East, Spring Brook, and Wetzel's Swamp near Harrisburg); Quebec (Knowlton); Rhode Island (Ashaway and Westerly); South Carolina (McClellanville); Vermont (Dummerston); Virginia (Rosslyn); Washington (Ashford and Mount Rainier at 2,700 ft.); Yukon (Whitehorse); Scotland; Ireland; Japan; and Formosa.

Most of the collection dates are from late in May to late in August. Some extreme dates are: April 10 at Carmel, Calif.; May 12 at Edmonton, Alta.; May 19 at McClellanville, S. C.; May 23 at Ithaca, N. Y.; May 27 at Chester, Mass.; May 28 at Takoma Park, Md.; May 29 at Ottawa, Ont.; August 23 at Poughkeepsie, N. Y.; August 25 in Delta County, Mich.; August 26 in Marquette County, Mich., and at Takoma Park, Md.; August 28 at Glen Echo, Md.; and October 6 at Matanuska, Alaska.

There are two reared specimens as follows: ♀, from *Acleris variana*, Grand River, N. S., June 6, 1932, M. L. Prebble. ♀, from *Lobesia viteana*, North East, Pa., 1916.

This species is Holarctic. In North America it ranges from the Canadian to the lower Austral zone. Adults occur from late spring to late summer. Females are much commoner than males.

12. Triclistus melanocephalus (Cameron), new combination

FIGURE 187,k

Exochus melanocephalus Cameron, 1886, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 280; "♂" = ♀. Type: ♀, Northern Sonora, Mexico (London).

Triclistus thoracicus Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 201; ♀ (new synonymy). Type: ♀, Dixie Landing, Va. (Washington).

Male: Unknown.

Female: Front wing 4.5 to 6.3 mm. long; face rather strongly mat, its punctures rather small, their interspaces about 0.6 their diameters; temple almost flat, its hairs numerous next to eye and occipital carina, medially very sparse or absent in some areas; metapleurum without hairs; median longitudinal carinae of propodeum absent except for basal and apical pairs of short stubs; hairs on area of second lateral area of propodeum sparse; median apical area of propodeum about 0.45 as long as wide; hind spur of hind tibia about 3.0 as long as wide (including hairs); second segment of hind tarsus about 2.7 as long as wide; first tergite unusually flat, about 1.4 as long as wide, its dorsal carinae extending about 0.30 its length; tergites without hairs except laterally, the number of hairs per tergite increasing towards the posterior tergites; apical notch of subgenital plate about 0.3 as deep as wide.

Head blackish; body ferruginous. Face usually more or less ferruginous; antenna ferruginous brown, paler basally and below; mandible brownish ferruginous, a little infuscate basally; palpi and tegula pale yellow; legs fulvous; abdomen sometimes infuscate apically.

Specimens: ♀, Madera Canyon at 5,600 ft., Santa Rita Mts., Ariz., Aug. 14, 1949 (Townes). ♀, Oak Creek Canyon, Ariz., May 20, 1947, H. and M. Townes (Townes). 2♀, Parker Creek, Sierra Ancha, Ariz., May 2 and 7, 1947, H. and M. Townes (Townes). 2♀, Plummers Island, Md., June 22 to 23, 1912, and Sept. 2, 1912, H. S. Barber (Washington). ♀, Clare Co., Mich., July 3, 1938, R. R. Dreisbach (Washington). ♀, Livingston Co., Mich., Aug. 28, 1950, R. R. Dreisbach (Dreisbach). 2♀, Moorestown, N. J., July 23, 1939, and Aug. 2, 1939, H. and M. Townes (Townes). 2♀, Big Indian Valley, Catskill Mts., N. Y., July 31, 1905, and Aug. 8, 1905, R. F. Pearsall (New York). ♀, Wake Co., N. C., June 12, 1951, H. and M. Townes (Townes). ♀, Crystal Beach, Madoc, Ont., July 26, 1951, A. P. Arthur (Martin). 2♀, Thunder Bay Beach, Ont., June 1943 and July 1943, H. S. Parish (Townes). 2♀, West Chester, Pa., July 8, 1902, J. C. Bradley (Ithaca). 2♀, Kirks Ferry, Que., Aug. 15, 1950, B. P. Beirne (Ottawa). 2♀, Knowlton, Que., July 11 and 28, 1936, G. S.

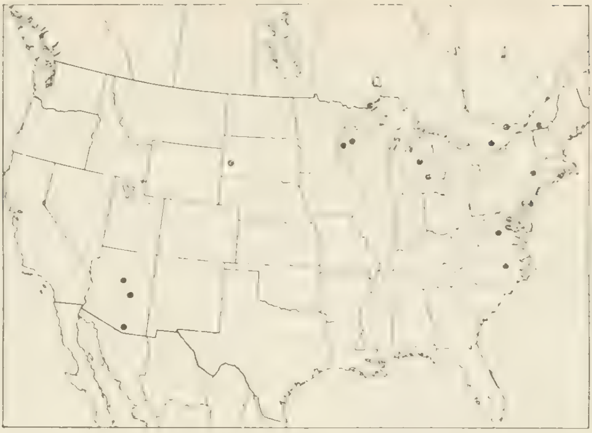


FIGURE 80.—Localities for *Triclistus Melanocephalus*.

Walley (Ottawa). ♀, Westerly, R. I., Sept. 6, 1936, M. Chapman (Townes). ♀, Rapid Canyon, S. Dak., Aug. 4, 1924 (Washington). ♀, Chain Bridge, Va., Sept. 18, 1921, J. R. Malloch (Washington). ♀, near Plummers Island in Maryland, Va., July 9, 1923, H. S. Barber (Washington). ♀, Skyline Drive, Va., Aug. 6, 1945, H. and M. Townes (Townes). ♀, Polk Co., Wis., July (Washington). ♀, Sawyer Co., Wis., Aug. 1 to 8, 1937, D. Murray (St. Paul).

This species occurs in the Alleghenian and Carolinian faunas, in the mountains of Arizona, and in Northern Mexico.

8. Genus Colpotrochia

FIGURE 171,a

Front wing 5.5 to 14 mm. long. Differs from *Triclistus* as stated in couplet 10 of the key to genera (p. 7). Typical species of *Colpotrochia* are easy to distinguish, as they have the temple very narrow and sloping, the propodeum almost smooth and weakly convex, the first tergite long and slender, and the abdomen banded with yellow. A few of the exotic species of the subgenus *Scallama*, however, are rather intermediate to *Triclistus* and need a careful application of the key characters for distinguishing them from *Triclistus*.

Colpotrochia is almost worldwide in distribution. Most of the species are tropical. The usual habitat is rank, shaded shrubbery. There are four species in eastern Nearctic America.

The subgenera of *Colpotrochia* are separated by the following key:

1. Nervellus strongly antefurcal (with its front end nearer the wing base than its hind end); areolet present. (Not Nearctic.) **1. Scallama**
   Nervellus vertical or postfurcal (with its front end farther from wing base than its hind end); areolet present or absent. **2. Colpotrochia**

1. Subgenus Scallama

Scallama Cameron, 1899, Mem. Proc. Manchester Lit. Philos. Soc., vol. 43, p. 216. Type: *Scallama trilineata* Cameron; designated by Morley, 1913.

Colpotrochioides Uchida, 1930, Journ. Fac. Agr. Hokkaido Univ., vol. 25, p. 263. Type: *Colpotrochioides orientalis* Uchida; original designation.

Areolet present; nervellus strongly antefurcal, broken far below the middle; lateral carina of propodeum present; third lateral area of propodeum usually defined; propodeal spiracle subcircular to long oval; first tergite 1.25 to 1.8 as long as wide; epipleura of second tergite about 4 to 7 times as long as wide; female subgenital plate rather narrowly triangular, somewhat convex with the apex truncate and medially notched.

This subgenus is somewhat transitional to *Triclistus*, having some of the characteristics of *Triclistus* in its venation, epipleura, female subgenital plate, and a tendency toward areolation of the propodeum. One Chilean species of *Scallama* (unidentified) has the propodeum rather completely areolated.

Scallama occurs in Chile, New Guinea, the mountains of Burma and of the Philippines, and in China and Korea. The described species referable to it, besides the genotype from Burma, are *Colpotrochioides fasciatus* Uchida 1940, from China, *Colpotrochioides orientalis* Uchida 1930, from Japan and Korea, *Colpotrochioides kurisuei* Uchida 1930, from Korea, *Colpotrochioides flavus* Uchida 1931, from Japan, and *Alomya petiolaris* Spinola 1851, from Chile. These five are new combinations in *Scallama*.

2. Subgenus Colpotrochia

Colpotrochia Holmgren, 1856, Svenska Vetensk. Akad. Handl., ser. 3, vol. 42, p. 80. Type: *Ichneumon elegantulus* Schrank; monobasic.

Alcocerus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 161. Type: *Tryphon? trifasciatus* Cresson; included by Davis, 1897.

Exochoides Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 37. Type: *Exochoides mexicana* Cresson; designated by Viereck, 1914.

Ischyrocnemopsis Ashmead, 1900, Proc. U. S. Nat. Mus., vol. 23, p. 81. Type: *Exochoides texana* Cresson; original designation.

Aithris Cameron, 1900, Mem. Proc. Manchester Lit. Philos. Soc., vol. 44, p. 106; new synonymy. Type: *Aithris coenutus* Cameron; monobasic.

Inoresa Cameron, 1909, Journ. Bombay Nat. Hist. Soc., vol. 19, p. 724. Type: *Inoresa pilosa* Cameron; monobasic.

Areolet present or absent; nervellus vertical or postfurcal, broken near the middle; lateral carina of propodeum present or absent; third lateral area of propodeum not completely defined; propodeal spiracle long oval; first tergite 1.5 to 3.0 as long as wide; epipleurum of second tergite about 1.3 to 7 times as long as wide; female subgenital plate scoop-shaped or triangular.

This subgenus is Holarctic, Neotropic, and Oriental. It contains two species groups, as defined in the key and descriptions below.

Key to the species groups and to the Nearctic species of the subgenus Colpotrochia

1. Lateral carina of propodeum entirely absent; epipleurum of second tergite less than 0.4 as wide as the tergite, its inner margin rather straight. TEXANA GROUP 2

   Lateral carina of propodeum present, usually complete; epipleurum of second tergite more than 0.35 as wide as the tergite, its inner margin strongly bowed. ELEGANTULA GROUP 3

2. Areolet present; nervellus postfurcal; hind femur yellow, blackish behind and often also in front . . . . **1. texana** (Cresson)

   Areolet absent; nervellus vertical; hind femur black, yellow at base and apex. **2. crassipes** (Provancher)

3. Hind femur yellow; thorax mostly yellow; areolet present. **3. fultoni,** new species

   Hind femur black; thorax mostly black; areolet absent. **4. trifasciata** (Cresson)

I. TEXANA GROUP

Areolet present except in the Nearctic *C. crassipes* and the Mexican *C. concinnus* Cresson 1868; nervellus postfurcal or vertical; lateral carina of propodeum entirely lacking; epipleurum of second tergite relatively narrow with its inner margin rather straight, ranging from about 0.1 to 0.4 as wide as its tergite; female subgenital plate triangular and weakly convex to scooplike (strongly convex).

The *texana* group includes a number of Neotropic species and two Nearctic species.

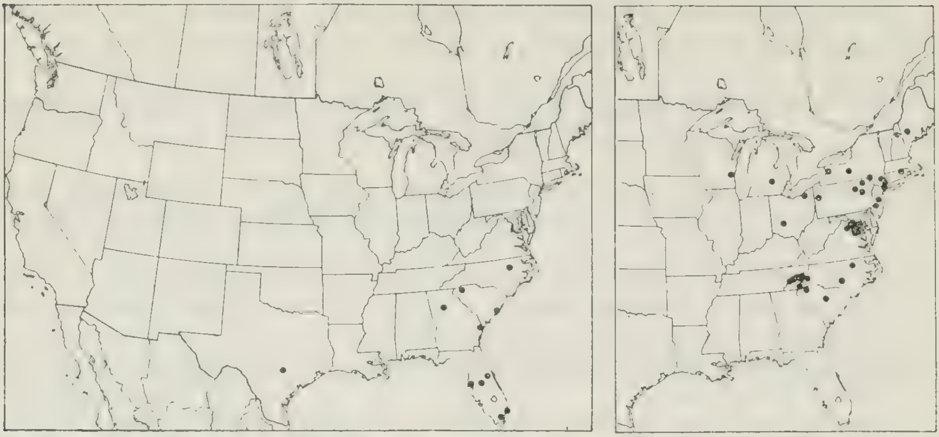
1. Colpotrochia (Colpotrochia) texana (Cresson)

Exochodes (!) *texana* Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 167; ♂. Type: ♂. Comal County, Tex. (Philadelphia).

Ischyrocnemis carolina Ashmead, 1890, Proc. U. S. Nat. Mus., vol. 12, p. 443; ♂. Type: ♂, North Carolina (Washington).

Front wing 6.5 to 7.0 mm. long; areolet present; nervellus distinctly postfurcal, broken a little above the middle; dorsal carinae of first tergite not distinct; epipleurum of second tergite narrow, about 7 times as long as wide; female subgenital plate scoop-shaped.

Black. Scape, pedicel, mouth parts, tegula, scutellum, postscutellum, and front and middle legs, yellow, the legs in part somewhat tinged with orange. Pronotum except for a subdorsal spot, propleura, lateral edge of mesoscutum, side of scutellum and postscutellum, upper edge of mesopleurum, mesopleurum next its coxa, mesepimeron, metapleurum below and posteriorly, propodeum except for a pair of dorsal basal spots, hind leg except for blackish or infuscate areas of variable extent on front and back of coxa and femur and brownish base and



FIGURES 81, 82.—Localities: 81 (left), *Colpotrochia (Colpotrochia) texana;* 82 (right), *C. (C.) crassipes.*

apical part of tibia, first tergite except for a black band centered just beyond spiracle, apical 0.35 of second and third tergites, apical 0.25± of fourth through sixth tergites, and all of the following segments, yellowish, orange yellow, or brownish yellow. Flagellum yellowish brown, darker apically. Wings tinged with yellowish brown, the front wing beyond the areolet with an indistinct infuscate spot. Veins brown, the stigma light brown. Specimens from Florida have the wings a little darker and with more of an orange cast than specimens from Brazil or from other parts of the United States.

Specimens: ♀, Atlanta, Ga., July 2, 1942, P. W. Fattig (Washington). ♀, Savannah, Ga., Mar. 17, 1950, H. Townes (Townes). ♂, Matheson Hammock, Miami, Fla., Apr. 11, 1951, H. and M. Townes (Townes). ♀, Orlando, Fla., January 1930, D. J. Nicholson (Washington). 2♀, Orlando, Fla., Apr. 26, 1930, A. L. Melander (Cambridge). ♀, Orlando, Fla., Apr. 29, 1942, D. F. Berry (Ottawa). 2♂, 1♀, Paradise Key, Fla., Apr. 6 and 12, 1951, H. and M. Townes (Townes). ♂, Polk Co., Fla., Mar. 31, 1930, L. E. Bryde (Townes). 3♂, Tarpon Springs, Fla., Mar. 20 and 21, 1950, and Dec. 12, 1949, H. Townes (Townes). ♀, Raleigh, N. C., June 8, 1923, C. S. Brimley (Washington). ♂ (type of *carolina*), North Carolina (Washington). ♀, Greenville, S. C., Aug. 28, 1955, G. and L. Townes (Townes). ♂, Greenville, S. C., Oct. 10, 1941, H. and M. Townes (Townes). 3♀, McClellanville, S. C., May 13, 14, and 15, 1944, H. and M. Townes (Townes). ♂ (type of *texana*), Comal Co., Tex. (Philadelphia). 2♂, 1♀, Nova Teutonia, Santa Catarina, Brazil, January 1955 and May 15, 1939, Fritz Plaumann (Townes).

We found the species flying among low tangled vines, weeds, and grass around the edges of open places, sometimes in partial shade.

This species is in the Austroriparian and Tropical faunas of the eastern States and occurs locally in the warmer parts of the Carolinian fauna. It is known also from southern Brazil. Adults seem to occur throughout the growing season.

2. Colpotrochia (Colpotrochia) crassipes (Provancher)

Ctenisens crassipes Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitent des hyménopterès, p. 109; ♀. Type: ♀, Toronto, Ont. (lost).

Front wing 5.5 to 7.8 mm. long; areolet absent; nervellus faintly postfurcal, broken a little below the middle; dorsal carinae of first tergite moderately distinct, extending a little beyond the spiracle; epipleurum of second tergite about 2.5 as long as wide; female subgenital plate weakly convex, very broadly triangular, with a broadly obtuse median point.

Black. Scape, pedicel, mouth parts, collar, broad upper part of pronotum, usually the front and lower edges of pronotum and adjacent propleurum, tegula, sublateral edge of mesoscutum, scutellum, postscutellum, area between postscutellum and hind wing, axilla of hind wing, propodeum except for basal margin, front and middle legs except sometimes for dorsal blackish blotches on their femora (especially in females), hind coxa except for more or less of the front and back, hind trochanters and tarsus, hind femur except basally and apically and in males sometimes below, hind tibia except for apical 0.3, first abdominal segment, apical half of second and third tergites, apical 0.3± of fourth tergite, apical 0.25± of fifth tergite, and all of the following segments, yellow. Flagellum yellowish brown, darker apically. Wings faintly tinged with brown, their veins and stigma brown.

Specimens (83♂, 50♀): From Connecticut (Woodstock); Georgia (Atlanta); Maine (Dryden); Maryland (Bowie, Cabin John, Glen Echo, Laurel, Plummers Island, and Takoma Park); Michigan (George Reserve in Livingston Co.); New Hampshire (Randolph); New Jersey (Moorestown and Princeton); New York (Boston, Dover, Hancock, Ithaca, New Rochelle, and Poughkeepsie); North Carolina (Crabtree Meadows at 3,600 ft. in Yancey Co., Hamrick, Lake Toxaway, Mount Mitchell, Southern Pines, and Wake Co.); Ohio (Bedford and Greene Co.); Pennsylvania (Lehigh Gap, Slippery Rock, Spring Brook, and Stillwater); South Carolina (Columbia and Greenville); Tennessee (four localities in Great Smoky Mountains National Park as follows: Chimneys, Elkmont, Ramsey Cascades Trail, and state road to Newfound Gap at 3,500 ft.); Virginia (Arlington, Dunn Loring, Falls Church, Galax, and Skyline Drive); West Virginia (Bolivar); and Wisconsin (Washington Co.). The type was from Toronto, Ont.

The great majority of collecting dates are in July and August, but a substantial number are in the last half of June and the first half of September.

Noteworthy early and late seasonal records are: June 10 at Moorestown, N. J.; June 13, 19, 20, 21, 23, and 25 at Takoma Park, Md.; June 24 at Bowie, Md.; September 19 at Princeton, N. J.; September 22 at Arlington, Va., and at Takoma Park, Md.; September 25 at Bolivar, W. Va.; October 9 at Greenville, S. C.; and October 31 at Southern Pines, N. C.

We have found the species common in deciduous woods in most Carolinian fauna localities. Sometimes it and *Colpotrochia trifasciata* are common in the same woods, but often they are not. Observations indicate that the present species flies higher in the underbrush than does *C. trifasciata.*

This species is in the Carolinian fauna, where it frequents the underbrush of deciduous woods. Adults occur mostly in July and August.

II. ELEGANTULA GROUP

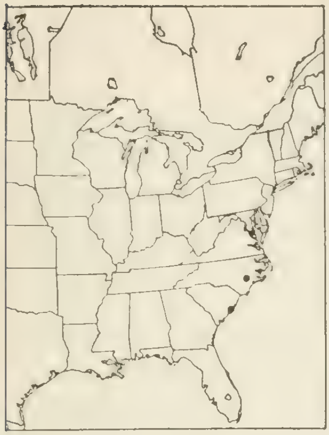
Areolet absent except in *C. fultoni;* nervellus vertical; lateral carina of propodeum present, usually complete; epipleura of second tergite relatively broad with the inner margin strongly bowed, more than 0.35 as wide as the tergite and usually meeting or overlapping medially; female subgenital plate scooplike (strongly convex).

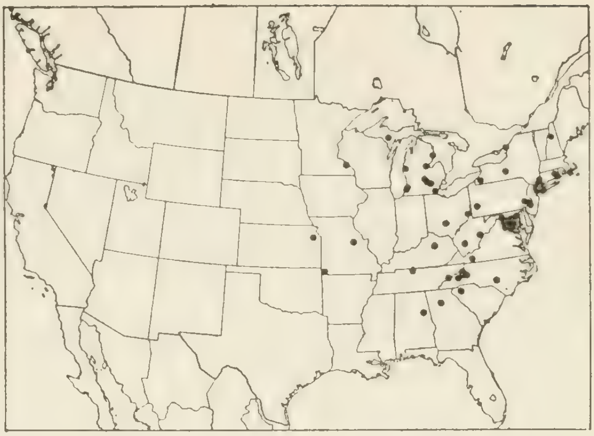
The *elegantula* group includes two Nearctic species and a number of others from the Neotropics and the Old World. Besides the two Nearctic species treated below, this species group contains *Ichneumon elegantulus* Schrank 1781 from Eurasia, *Colpotrochia nipponensis* Uchida 1930 from Japan, *Exochoides mexicana* Cresson 1868, from Mexico, and *Colpotrochia pilosa* Cameron 1909 from the Oriental region. There are also a number of undescribed species.

3. Colpotrochia (Colpotrochia) fultoni, new species

Front wing 8.2 to 9.0 mm. long; areolet present; nervellus vertical, broken a very little below the middle; lateral carina of propodeum distinct, but thick and low; dorsal carinae of first tergite rather sharp, fading out well beyond the spiracle; subgenital plate scoop-shaped.

Yellow. Head, three broad stripes on mesoscutum coalescing in front of scutellum, subdorsal spot on side of pronotum, posterodorsal area on mesopleurum, sometimes triangular spot above and a short stripe below position of sternaulus, and subbasal transverse bands on third to fifth tergites, black. The interantennal lamella is narrowly bordered with yellow. Flagellum brown, reddish below; base of hind





FIGURES 83, 84.—Localities: 83 (left), *Colpotrochia* (*Colpotrochia*) *fultoni;* 84 (right), *C.* (*C.*) *trifasciata.*

tibia tinged with brown; first tergite often with a subapical brown spot; second tergite with an antemedial brown area; wings tinged with yellowish brown; veins brown; stigma yellowish brown.

Type: ♀, Wallace, N. C., June 17, 1949, H. Townes (Washington, USNM 63633).

Paratypes: ♀, McClellanville, S. C., May 16, 1944, H. and M. Townes (Townes). ♀, Westmoreland State Park, Westmoreland Co., Va., July 8, 1951, K. V. Krombein (Townes).

The two specimens collected by the authors were taken flying over dense, unshaded, waist high to shoulder high vines and bushes. The type was collected while on a trip with Dr. B. F. Fulton, and is named *fultoni* in recognition of his many contributions to the study of insects.

4. Colpotrochia (Colpotrochia) trifasciata (Cresson)

Tryphon? trifasciatus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 276; ♂. Type: ♂, Pennsylvania (Philadelphia).

Front wing 6.0 to 7.5 mm. long; areolet absent; nervellus vertical, broken a little below the middle; lateral carina of propodeum moderately strong, complete; dorsal carinae of first tergite rather sharp, extending beyond the spiracle; subgenital plate scoop-shaped.

Black. Scape except for an external fuscous stripe, pedicel below and mesally, palpi, tegula, scutellum, postscutellum, usually a transverse blotch of variable size on propodeum, front and middle legs of male except for more or less of their coxae basally and sometimes for fuscous areas on femora, front coxa of female below, front trochanter of female except sometimes for blackish area posterodorsally, front femur of female except for posterodorsal blackish blotch, front and middle tibiae and tarsi of female, apex of middle coxa of female, middle trochanter of female except sometimes for posterodorsal fuscous mark, middle femur of female at base and on most of under side and apical third, hind trochanter except sometimes for fuscous marks in female, base of hind femur, hind tibia except for blackish base and brownish apex, hind tarsus, apical 0.3±, 0.5±, and 0.4± of first three tergites, respectively, and often apical margin of fourth tergite (especially in males), yellow. In males the hind coxa and femur are often largely yellow. Wings subhyaline, their veins and stigma dark brown.

Specimens (138♂, 84♀): From Alabama (Pyriton); Connecticut (Lebanon and Voluntown); District of Columbia (Georgetown); Georgia (Atlanta); Kansas (Lawrence); Kentucky (Lexington); Maine ("Jackson"); Maryland (Beltsville, Glen Echo, Plummers Island, Ruxton, and Takoma Park); Massachusetts (Woods Hole); Michigan (Ann Arbor, Benton Harbor, Dickinson Co., East Lansing, George Reserve in Livingston Co., Hart, Iosco Co., Midland Co., Munroe Co., and St. Joseph); Minnesota (Wabasha); Missouri (Noel and Warrenton); New Hampshire (Franconia); New Jersey (Fort Lee, Moorestown, Palisades, and "Weymouth"); New York (Bear Mt., Bemus Point, Farmingdale, Ithaca, Millwood, and Poughkeepsie); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Hamrick, Linville Falls, north fork of Swannanoa River in the Black Mts., "Scenic Highway in Cumberland Knob Park," and Southern Pines); Nova Scotia (Clifton); Ohio (Bridgeport, "Dean Forest," "Puritas Springs," and Ross Co.); Ontario (Ivy Lea); Pennsylvania (Allegheny Co., Philadelphia, and Valley Forge); Quebec (Lac Mercier); South Carolina (Greenville); Tennessee (Elkmont in Great Smoky Mountains National Park and Lafayette); Virginia (Chain Bridge, Falls Church, Galax, Glencarlyn, Great Falls, and "Peconic Springs"); and West Virginia (Bolivar, Cheat Mt. at 2,000 ft., and Kanawha Station).

Most of the collecting dates are from June 15 to the end of August. Especially early and late dates are: April 27 at Greenville, S. C.; May 10 at Noel, Mo.; May 18 at Atlanta, Ga.; May 20 at Warrenton, Mo.; May 24 at Lawrence, Kans.; May 28 at Falls Church, Va.; June 1 at Petersburg, Va., and in Cumberland Knob Park, N. C.; June 4 at Moorestown, N. J.; June 19 at the George Reserve, Livingston County, Mich.; September 6 at Riverton, N. J.; September 6 and 13 at Takoma Park, Md.; and September 19 at Bolivar, W. Va.

It is a very common species in the low herbage and underbrush of rich deciduous woods.

This species is in the Carolinian and Alleghenian faunas. Adults are commonest in July and August.

9. Cubus, new genus

Figure 170,b

Front wing about 8.5 mm. long; body punctation fine and weak; face and clypeus evenly convex, the face continued dorsally between antennal sockets as a triangle with an acuminate point, and continued back between the antennae as a high lamella, the lamella with a deep longitudinal groove in its dorsal edge, in profile the edge of the lamella dorsally semicircular; temple long, strongly oblique, weakly concave or flat; head in profile concave between hind ocellus and occipital carina; occipital carina rather close to foramen magnum, complete, strong, and somewhat reflexed; cheek about 0.6 as long as basal width of mandible; mandible rather flat, tapered apically, the lower tooth much shorter and smaller than the upper tooth; labrum distinctly projecting; flagellum moderately slender, weakly swollen medially; upper margin of pronotum heavy, rounded; propleurum cubically swollen; scutellum rather flat, without a lateral carina; areolet absent; nervulus postfurcal by about 0.4 its length; nervellus broken near its middle; prepectal carina strong, complete, its dorsal end at front end of subtegular ridge; sternaulus a short broad shallow groove; metapleurum smooth, polished, with very sparse weak punctures; propodeum sloping, rather evenly convex in profile but apically a little more abruptly declivous, without carinae except for pleural carina and remnants of the median longitudinal carinae, which are present on its apical 0.3 ± and indicated at its extreme base by a pair of tubercles; propodeal spiracle long oval; legs very stout; second trochanter of front and middle legs completely fused with its femur; front spur of middle tibia a little shorter and stouter than the hind spur; tarsal claws apparently simple; abdomen of moderate length; first tergite rather narrow basally, its spiracle near its basal 0.35, without distinct median longitudinal carinae; first sternite extending about 0.3 the length of tergite; epipleurum of first tergite vestigial, of second tergite rather narrow, of third through sixth tergites wide; second tergite without dorsal carinae; first six tergites well exposed, the seventh tergite partly retracted in male, completely retracted in female; female subgenital plate elongate triangular.

Genotype: *Exochus validus* Cresson, 1865.

The generic name is from the Latin "cubus" (a cube), referring to the shape of the propleurum.

This is a Neotropic genus. Besides the genotype, from Mexico, we have a new species from Guatemala and another from Venezuela. The Venezuelan species is figured (fig. 170,b) to represent the genus.

10. Genus Periope

FIGURE 172,a,b

Periope Haliday, 1839, Ann. Nat. Hist. vol. 2, p. 114. Type: *Periope auscultator* Haliday; monobasic.

Monoplectron Holmgren, 1856, Svenska Vetensk. Akad. Handl., ser. 3, vol. 42, pp. 64, 81. Type: (*Monoplectron zygaenator* Holmgren)=*auscultator* Haliday; monobasic.

Oligoplectron Foerster, 1868, Verh. Naturh. Ver. Rheinlande vol. 25, p. 161. Type: *Periope auscultator* Haliday; designated by Viereck, 1914.

Monoplectrochus Heinrich, 1949, Mitt. Münchner Ent. Ges. vol. 35–39, p. 109. Type: *Monoplectrochus hoerhammeri* Heinrich; original designation.

Front wing 4.5 to 6.0 mm. long; body punctures of moderate size, sharp, usually close; face and clypeus rather strongly convex transversely, weakly convex longitudinally, the clypeus a little more convex than the face and separated from face by a broad, weak, transverse impression; interantennal process of face a little acuminate from front view, extending between antennal sockets as a semicircular lamella but not running up on to frons; temple moderately convex; occipital carina moderately strong, incomplete next to hypostomal carina; cheek 0.5 to 0.8 as long as basal width of mandible; mandible rather broad, somewhat tapered toward apex, its outer face with coarse punctures, its apical teeth both large and approximately equal in size; apex of labrum projecting a little; flagellum more or less enlarged toward apex, definitely clavate; upper margin of pronotum posteriorly a little swollen, anteriorly not swollen and with a shallow submarginal impression; propleurum weakly convex; scutellum strongly convex, without a lateral carina; areolet small, stalked above; nervulus postfurcal by about 0.5 its length; nervellus broken near its lower 0.4; prepectal carina extending dorsally only to a little above level of lower corner of pronotum, its upper end distant from front margin of mesopleurum; sternaulus a broad weak impression or almost lacking; metapleurum smooth, polished, with numerous moderately close, sharp punctures; propodeum rather short, strongly convex in profile, rather completely carinated except that the costula is absent and the median basal area and areola are confluent; propodeal spiracle oval to subcircular; legs moderately stout; second trochanter of front and middle legs incompletely fused with the femur; spurs of middle tibia rather long, the front spur a little shorter than the hind spur; hind tibia with a single long spur (all other genera of Metopiinae have two spurs on the hind tibia); tarsal claws apparently simple except in the female of *P. auscultator*, which has them coarsely pectinate; abdomen somewhat clavate; first tergite rather narrow basally, its spiracle near or a little beyond its middle; median longitudinal carinae of first tergite sharp for most of its length, obsolescent near apex; second tergite basally sometimes with two weak median longitudinal carinae; epipleurum of second tergite very narrow to moderately wide, of third tergite narrowly wedge-shaped to moderately wide, of fourth to sixth tergites moderately wide; seventh tergite exposed in both sexes; female subgenital plate unspecialized, large, rhombic, and weakly convex.

There are three known species of *Periope: P. auscultator* Haliday 1839 of Europe, *P. hoerhammeri* (Heinrich) 1949 of Europe and Japan, and *P. aethiops* (Cresson) 1868 of eastern North America. *P. hoerhammeri* is by far the most primitive of the three, having a shorter cheek, longer propodeum, and a distinct glymma in the first tergite. *P. aethiops* is somewhat intermediate between *P. hoerhammeri* and *P. auscultator.* All three are structurally very distinct, and it would be a matter of opinion as to whether or not each should be in a separate genus.

Periope aethiops (Cresson)

Tryphon aethiops Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 106; ♀. Lectotype: ♀, Massachusetts (Philadelphia).

Chorinaeus pulchripes Provancher, 1883, Naturaliste Canadien, vol. 14, p. 12 (Faune, p. 800); ♀. Type: ♀, Chicoutimi, Que. (Quebec).

BIOLOGY: Washburn, 1918, Rep. State Ent. Minnesota, vol. 17, p. 173.

Front wing 4.5 to 5.8 mm. long; clypeus and face with only a faint impression separating them; head prolonged below, the cheek about 1.25 as long as basal width of mandible; glossae elongate; flagellum weakly clavate in male, more strongly clavate in female, its wider segments about 1.2 as wide as long in male, about 1.25 as wide as long in female; subtegular ridge thick and rounded; propodeum moderately short, its combined basal area and areola about 1.1 as long as wide; first tergite somewhat narrowed basally, without a distinct glymma; abdomen of female somewhat clavate, not compressed or elongate apically.

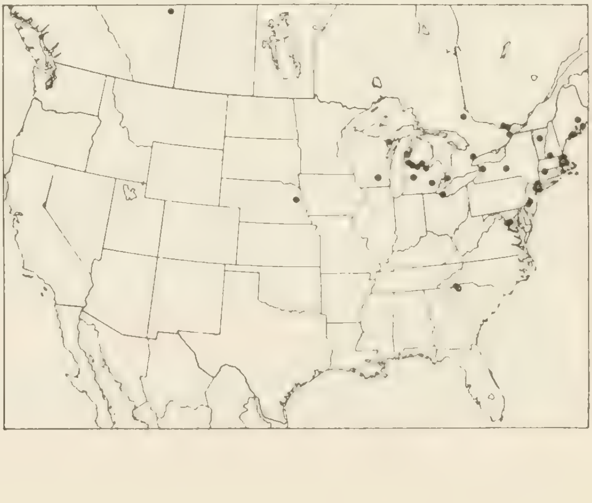


FIGURE 85.—Localities for *Periope aethiops.*

Black. Flagellum blackish basally, the rest blackish brown in male, reddish brown in female; subtegular ridge, apex of front and middle femora, extreme apex of hind femur, basal 0.6 of tibiae, and middle and hind tibial spurs, ivory white; apical 0.4 of front tibia, front tibial spur, and front and middle tarsi, brown; hind tarsus fuscous; tegula whitish, its apical 0.5± brown. In some specimens, most often in females, the apical 0.3± of the second through fourth tergites are brownish.

Specimens (23♂, 61♀): From Alberta (Slave Lake and Tofield); Connecticut (Colebrook); Maine (Bangor, Southport, and South West Harbor); Maryland (Takoma Park); Massachusetts (Forest Hills, Holliston, Marblehead, and Milton); Michigan (Alto, Ann Arbor, Benzie Co., Isabella Co., Lake Co., Mecosta Co., Menominee Co., Midland Co., and Saginaw Co.); Nebraska (West Point); New Hampshire (Jaffrey); New Jersey (Bridgeboro, Burlington, and Montclair); New York ("Bryn Mawr Park," Chafee, Ithaca, Nyack, and White Plains); North Carolina (Cedar Mt.); Ohio (Put-in-Bay); Ontario (Rock Cliff Park, Spencerville, Timagami, and Toronto); Quebec (Aylmer and "Sainte Anne's"); South Carolina (Venus); Vermont (Stowe); Virginia (Glencarlyn); and Wisconsin (Madison).

Collecting dates are in early fall. Especially early and late dates are: August 21 at Timagami, Ont.; August 15 at Slave Lake, Alta.; August 24 and 31 at Spencerville, Ont.; August 25 at Tofield, Alta.; August 28 at Milton, Mass.; August 29 at Ithaca, N. Y.; August 30 in Menominee Co., Mich.; September 24 at Toronto, Ont. and at Bridgeboro, N. J.; September 26 at Ann Arbor, Mich.; September 30 in Midland Co., Mich.; October 4 at Cedar Mountain, N. C., and at Burlington, N. J.; October 8 and 20 at Takoma Park, Md.; and October 13 at Put-in-Bay, Ohio.

We have found the species only in weedy meadows, on the flowers of *Aster*. Washburn (loc. cit.) mentions finding the species at Itasca Park, Minn., in late August, "sunning on Asters."

This species is in the Alleghenian fauna. Adults may be found on the flowers of *Aster*, in early fall.

11. Genus Spudaeus

FIGURE 171, b

Trachyderma Gravenhorst, 1829, Ichneumologia europaea, vol. 3, p. 283; name preoccupied. Type: *Trachyderma scabra* Gravenhorst; monobasic.

Spudaeus Gistel, 1848, Naturgeschichte des Thierreichs für höhere Schulen, p. xi; new name.

Tylocomnus Holmgren, 1873, Öfvers. Svenska Vetensk. Akad. Forh., vol. 30 (4), p. 76; new name.

Front wing 9.0 to 11.0 mm. long; body with coarse, moderately dense punctures; combined face and clypeus weakly convex, the upper margin of face produced medially as a short broad triangle between bases of antennae; lower half of frons with an inconspicuous median carina which continues between antennal sockets to back side of interantennal process of face; temple moderately convex; occipital carina strong above, weak laterally, absent ventrally; cheek about 1.0 as long as basal width of mandible; mandible rather short, moderately broad, tapered toward apex, its teeth broad, the lower tooth a little shorter than upper tooth; labrum not projecting beyond margin of clypeus; flagellum long, moderately slender; upper margin of pronotum not swollen, paralleled by a very weak submarginal impression; propleurum weakly convex; scutellum strongly convex, without a lateral carina; areolet of moderate size, subrhombic, with a short stalk above; nervulus interstitial; nervellus broken near its lower 0.4; prepectal carina complete, its dorsal end at front margin of mesopleurum near midheight of hind margin of pronotum; sternaulus a short, broad impression; metapleurum with coarse, rather sparse punctures; propodeum short, its apical half sharply declivous, the apex of its area dentipara produced as a short triangular tooth; propodeum completely carinated except that costula is lacking and areola and median basal area are confluent; propodeal spiracle elongate; legs moderately stout; first trochanter of front and middle legs almost completely fused with its femur; front spur of middle tibia longer and stouter than hind spur; tarsal claws apparently simple; abdomen approximately parallel-sided, rather short; first tergite broad at base, its spiracle near its basal 0.3, its median dorsal carinae sharp to its apex; second tergite traversed by a median dorsal pair of carinae; epipleura of first and second tergites very narrow, of third and following tergites moderately wide; seventh tergite of male and sixth tergite of female somewhat retracted; seventh tergite of female entirely retracted; female subgenital plate large, subrhombic.

This genus includes one Holarctic species and one Nearctic species as treated below, plus two species described from Russia.

Key to the Nearctic species of Spudaeus

1. Hind femur and tibia uniformly ferruginous or fulvous; coxae and first trochanters black, the hind coxa sometimes partly ferruginous. **1. scaber** (Gravenhorst)

   Hind femur fulvous, the femur black at apex and the tibia black at apex and at base; coxae and first trochanters fulvous, the coxae sometimes partly infuscate . . . . **2. indigus** (Davis)

1. Spudaeus scaber (Gravenhorst)

FIGURE 171,b

Front wing 9.5 to 11.5 mm. long. Structurally similar to *S. indigus* except that the body punctures tend to be a little stronger and the body wrinkling a little weaker. This difference is most evident on the combined first and second lateral areas of the propodeum, which in this species has rather small, strong, adjacent punctures and indistinct wrinkling, while in *S. indigus* it has the punctures a little weaker and the wrinkling a little stronger. Were it not for the sharp color difference the structural distinction between the two species would probably be overlooked.

Black. Coxae and first trochanters black, those of the hind leg sometimes partly ferruginous; hind second trochanter blackish to fulvous; legs beyond trochanters fulvous to ferruginous, the hind tarsus brownish apically; wings faintly to strongly infuscate.

This is a Holarctic species. Old World and New World specimens differ a little in color, permitting a subspecific distinction between them:

1. Wings faintly infuscate; range: Europe. . . **1a. scaber scaber** (Gravenhorst)
Wings moderately to rather strongly infuscate; range: North America. **1b. scaber umbrosus** (Davis)

1a. Spudaeus scaber scaber (Gravenhorst)

Trachyderma scabra Gravenhorst, 1829, Ichneumonologia europaea, vol. 3, p. 285; ♂. Type: ♂, Fennia (lost).

Wings faintly infuscate; legs beyond trochanters fulvous, the hind tarsus brownish apically.

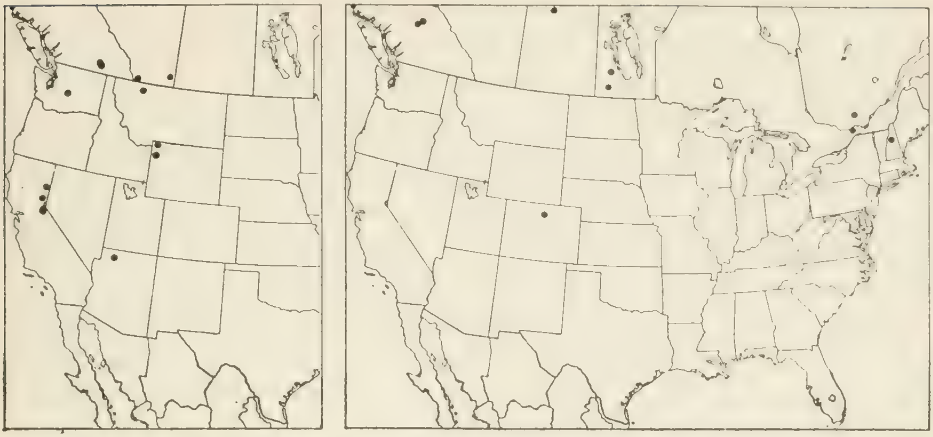
This subspecies occurs in northern and central Europe. The host is reported as *Panolis flammea*.

1b. Spudaeus scaber umbrosus (Davis)

Tylecomnus (!) *umbrosus* Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 203; ♀. Lectotype: ♀, Washington (Philadelphia).

Wings moderately to rather strongly infuscate; legs beyond trochanters fulvous to ferruginous, the hind tarsus brownish apically. Specimens from California, Arizona, and Wyoming tend to have the wings a little darker than in specimens from Montana, Washington, British Columbia, and Alberta.

Specimens: ♀, Cypress Hills, Alta., July 10, 1950, E. H. Strickland (Townes). ♂, Waterton, Alta., June 19, 1923, H. L. Seamans (Ottawa). ♀, North Rim of Grand Canyon at 8,000 ft., Ariz., June 1, 1946, R. M. Bohart (Townes). ♀, Pass Creek near Robson, B. C., May 21, 1947, H. R. Foxlee (Ottawa). ♂, Robson, B. C., May 16, 1947, H. R. Foxlee (Ottawa). ♂, ♀, "Angora Peak at 8,625 ft.," Calif., July 10 and 19, 1931, E. O. Essig (Berkeley). ♂, Fallen Leaf Lake in Eldorado Co., Calif., July 1931, O. H. Swezey (Townes). 4♀, Gold Lake in Sierra Co., Calif., July 18, 23, 27, and 30, 1921, C. L. Fox (San Fransco and Townes). ♀, Strawberry Lake in Eldorado



FIGURES 86, 87.—Localities: 86 (left) *Spudaeus scaber umbrosus;* 87 (right) *S. indigeus.*

Co., Calif., Aug. 5, 1912, E. C. Van Dyke (San Francisco). ♀, Summit Camp in Lassen Co., Calif., June 28, 1941, Claude I. Smith (Berkeley). 4♂, 1♀, "Tamarack Lake" at 7,700 ft., Calif., July 10 and 12, 1931, E. O. Essig (Berkeley). ♀, Upper Echo Lake at 7,400 ft., Calif., July 24, 1933, E. O. Essig (Berkeley). ♀, Blackfeet Indian Reservation, Mont., July 5, 1938, E. C. Van Dyke (San Francisco). 4♀, Nevada (Philadelphia and Washington). ♀, Kittitas Co., Wash., July 22, 1934 (Townes). ♀, "Satus Pass," Wash., July 9, 1935, Jack Beamer (Lawrence). ♀ (lectotype), Washington (Philadelphia). ♀, Grand Teton National Park, Wyo., July 14, 1939, D. J. and J. N. Knull (Townes). ♂, Roosevelt Lodge, Yellowstone National Park, Wyo., July 1, 1938, E. C. Van Dyke (San Francisco).

This subspecies occurs in the Canadian zone of the western mountains. Most adults have been taken in July, but a few as early as mid-May and as late as early August.

2. Spudaeus indigus (Davis)

Tylecomnus (!) *indigus* Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 204; ♂, ♀. Lectotype: ♀, Colorado (Philadelphia).

Front wing 9.0 to 11.0 mm. long. Structural differences as discussed under *S. scaber.*

Black. Legs fulvous, the apex of hind femur, base and apex of hind tibia, and hind tarsus black. In a specimen from British Columbia (♀, Hundred Mile House, June 29, 1938, G. S. Walley (Ottawa)), the front and middle coxae are mostly blackish and somewhat less than half of the hind coxa is infuscate. All other specimens have the coxae entirely fulvous.

Specimens: ♀, Fawcett, Atla., June 10, 1934, E. H. Strickland (Townes). ♀, Canim Lake, B. C., June 22, 1938, G. S. Walley (Ottawa).

2♀, Hundred Mile House, B. C., June 29 and July 4, 1938, G. S. Walley (Ottawa). ♀, Estes Park, Colo., July 11, 1934, A. L. Melander (Cambridge). ♀ (lectotype), Colorado (Philadelphia). ♂, "Klondike Basin," Maine, July 7, 1939 (Townes). 5♀, Aweme, Man., June 2, 1936, June 22, 1924, and June 27, 1925, R. D. Bird (Ottawa, Townes, and Washington). ♂, Riding Mt. Park, Man., June 5, 1930, J. McDunnough (Ottawa). ♀, Newcastle, N. B., June 18, 1914, F. M. McKenzie (Ottawa). ♀, Waweig, N. B., June 20, 1938, T. N. Freeman. (Ottawa). ♂, Franconia, N. H. (Philadelphia). ♀, Baddeck, N. S., June 25, 1936, T. N. Freeman (Ottawa). ♂, Mer Bleue, near Ottawa, Ont., May 29, 1937, J. McDunnough (Ottawa). ♀, Nominingue, Que., June 13, 1941, O. Peck (Ottawa). ♀, Waskesiu Lake, Sask., July 7, 1939, A. R. Brooks (Ottawa).

This species is transcontinental in the Canadian zone. Most adults have been taken in June.

12. Bothromus, new genus

Figure 176,b

Front wing 4.0 to 6.2 mm. long; body with medum-sized, moderately dense punctures; combined face and clypeus weakly convex, the upper margin of face produced medially as a very short broad point over bases of antennae; frons smooth, without a median carina or process; temple moderately convex; occipital carina moderately strong above, weak laterally, and lacking below; cheek about 0.8 as long as basal width of mandible; mandible short, moderately broad, tapered toward apex, its teeth moderately broad, the lower tooth a little smaller than upper tooth; labrum just visible beyond margin of clypeus; flagellum rather short, a little thickened medially, more slender apically; upper margin of pronotum not swollen; propleurum weakly convex; subtegular ridge rounded, in rear view deeply hollowed out so that it appears to be a thin, curved-over flange; scutellum convex, without a lateral carina or with a weak lateral carina basally; areolet absent; intercubitus vertical, separated from second recurrent by 0.3 its length; nervulus postfurcal by about 0.3 its length; nervellus broken near its lower 0.3; dorsal end of prepectal carina near front edge of mesopleurum, at level of midheight of pronotum; sternaulus not distinct; metapleurum with coarse punctures all over; apical half of propodeum sharply declivous, the apex of its area dentipara produced as a broad weak tooth; propodeum completely carinated except that costula is absent and median basal area and areola are confluent; propodeal spiracle short oval; legs moderately stout; first trochanter of front and middle legs almost completely fused with its femur; spurs of middle tibia long and slender, the front spur a little shorter than hind spur; tarsal claws apparently simple;

abdomen approximately parallel-sided; first tergite broad at base, in profile strongly convex above, its spiracle near its basal 0.25, its lateral and median pair of longitudinal carinae strong and sharp to the apex; second tergite with a pair of median longitudinal carinae basally; epipleurum of first tergite vestigial, of second tergite very narrow, of third tergite narrowly wedge-shaped, of fourth tergite moderately wide, of fifth and following tergites not separated from the tergite; seventh tergite not strongly retracted in either sex; female subgenital plate an unspecialized sclerite of moderate size.

Genotype: *Tylecomnus minoris* Davis.

The generic name is from the Greek "bothros" (cavity) plus "omos" (shoulder), in reference to the cavity in the subtegular ridge.

Key to the Species of Bothromus

1. Area of first tergite between lateral longitudinal carina and ventral edge of tergite tapered beyond spiracle, subapically about 0.7 as wide as middle tibia; apical 0.2 or less of hind femur fuscous . . . . . **1. minoris** (Davis)
   Area of first tergite between lateral longitudinal carina and ventral edge of tergite uniform in width beyond spiracle, subapically about 1.1 as wide as middle tibia; apical 0.25 to 0.8 of hind femur fuscous . **2. gibbus,** new species

1. Bothromus minoris (Davis), new combination

Figure 176,b

Front wing 4.0 to 6.2 mm. long; first tergite in profile moderately convex, about 2.6 as long as high, the area between its lateral longitudinal carina and ventral edge tapered beyond spiracle, subapically about 0.7 as wide as the width of middle tibia; second tergite moderately convex, with close, moderate-sized punctures, its median pair of carinae extending 0.3 to 0.7 its length in male, extending 0.2 to 0.35 its length in female; seventh tergite rather strongly retracted.

There are two subspecies, separable on color as indicated below:

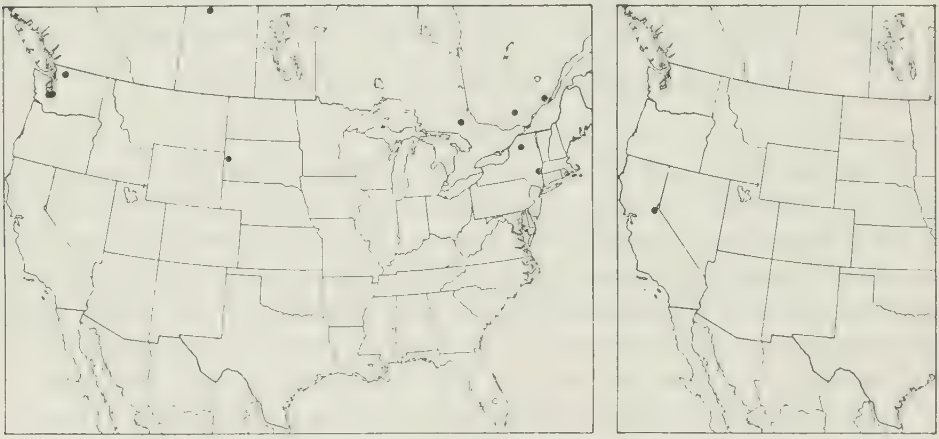
1. Hind femur fulvous, its apical 0.15 to 0.2 fuscous; hind tibia whitish submedially, fuscous at base and apex; tegula whitish; range: transcontinental in Canadian and Transition zones . . . . . **1a. minoris minoris** (Davis)
   Hind femur entirely fulvous, hind tibia ferruginous, infuscate at apex and apically above; tegula dark brown; range: California.
   1b. minoris cruralis, new subspecies

1a. Bothromus minoris minoris (Davis), new combination

Tylecomnus (!) *minoris* Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 204; ♀.
Type: ♀, New Hampshire (Philadelphia).

Black. Palpi of male, under side of scape of male, tegula, subtegular ridge, and spurs of middle and hind tibiae whitish; flagellum blackish brown, paler beneath (especially in male); palpi of female, front and middle legs, and hind coxa, trochanters, and femur fulvous, the apical 0.15 to 0.2 of hind femur fuscous and the male front and middle coxae, trochanters, tarsi, and basodorsal part of tibiae stramineous to pale fulvous; hind tibia fuscous on its basal 0.2± and apical 0.45±, the rest dirty whitish; hind tarsus fuscous, a little paler at the incisures; first two abdominal tergites varying from black to ferruginous.

Specimens: ♀, Jordan Pond, Mount Desert, Maine, June 10, 1921, C. W. Johnson (Washington). ♀ (type), New Hampshire (Philadelphia). ♀, Cranberry Lake, N. Y., June 16, 1924, E. A. Hartley (Washington). ♀, Greene Co. at 2,500 ft., N. Y., June, L. O. Howard (Washington). ♂, Sudbury, Ont., 1890 (Ottawa). ♂, Montigny, Que., June 1941, O. Peck (Townes). 3♀, Stoneham, Que., June 21, 1938, H. and M. Townes (Townes). ♂, Waskesiu Lake, Sask., June 8, 1938, J. G. Rempel (Townes). ♀, Spearfish, S. Dak., July 25, 1924 (Washington). ♀, Ashford, Wash., Aug. 18, 1940, H. and M. Townes (Townes). ♀, Elbe, Wash., July 13, 1940, H. and M. Townes (Townes). ♂, Mount Baker, Wash., Aug. 11, 1925, A. L. Melander (Cambridge).



Figures 88, 89.—Localities, subspecies of *Bothromus minoris:* 88 (left), *minoris;* 89 (right), *cruralis.*

This subspecies occurs in the undergrowth of woods across the continent, in the Canadian and Transition zones.

1b. Bothromus minoris cruralis, new subspecies

Female type: Black. Flagellum blackish brown, paler beneath; palpi brown; tegula dark brown; subtegular ridge white; legs fulvoferruginous, the hind tibia infuscate at apex and apically above, the hind tarsus fuscous (a little paler at the incisures), and the spurs of middle and hind tibiae pale fulvous.

Type: ♀, Camino, Calif., June 30, 1948, H., M., G., and D. Townes (Washington, USNM 63634).

2. Bothromus gibbus, new species

Front wing 5.0 to 5.5 mm. long; first tergite in profile strongly convex, about 2.0 as long as high, the area between its lateral longitudinal carina and ventral edge of uniform width beyond spiracle, subapically about 1.1 as wide as the width of middle tibia; second tergite rather strongly convex, with close rather coarse punctures, its median pair of carinae extending 0.75 its length in male, extending 0.4 to 0.55 its length in female; seventh tergite moderately retracted.

Black. Palpi of male, spot on under side of scape of male, tegula, subtegular ridge, and spurs of middle and hind tibiae whitish; flagellum blackish brown, paler beneath (especially in male); palpi of female some shade of brown; legs fulvous, the apical 0.25 to 0.8 of hind femur and the hind tibia and tarsus infuscate, the tarsus paler at the incisures.

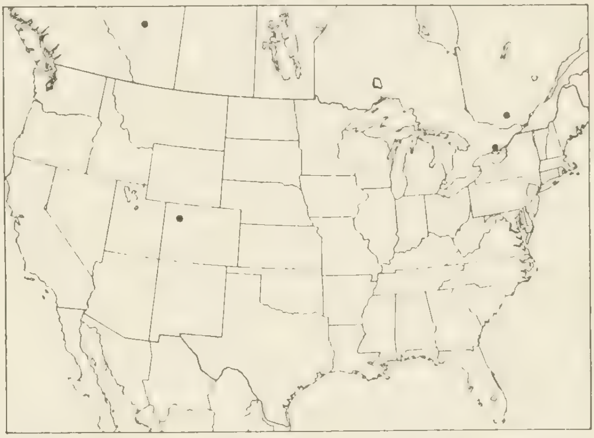


FIGURE 90.—Localities for *Bothromus gibbus*.

Type: ♀, Elk River, Colo., July, C. F. Baker (Washington, USNM 63635).

Paratypes: ♀, Gull Lake, Alta., June 27, 1929, E. H. Strickland (Townes). ♀, Blackburn, Ont., May 20, 1941, O. Peck (Ottawa). ♂, Mer Bleue, Que., May 29, 1935, W. J. Brown (Ottawa).

13. Genus Drepanoctonus

FIGURE 173,a

Drepanoctonus Pfankuch, 1911, Deutsche Ent. Zeitschr., p. 688. Type: *Drepanoctonus tibialis* Pfankuch; monobasic.

Front wing 7.5 to 8.5 mm. long; body punctures moderately small, rather sharp and dense; combined face and clypeus weakly convex, the upper margin of the face produced medially as an acute triangle between bases of antennae, the triangle continued backward between bases of antennae as a thin plate, the upper margin of plate deeply grooved; lateral and posterior margins of antennal socket developed into a high flange with an earlike dorsolateral projection; temple very short, almost flat; occipital carina strong above, weak laterally, absent below; cheek about 0.6 as long as basal width of mandible; mandible rather short, tapered a little toward apex, its two teeth of equal size; apex of labrum just reaching apical margin of clypeus; flagellum of moderate length, unspecialized; pronotum posteriorly with a swelling just below its upper margin, its upper margin otherwise thin and unmodified; propleurum weakly convex; scutellum short, convex, with a weak, often incomplete, lateral carina; areolet absent; intercubitus distinctly reclivous, separated from second recurrent by 0.1 its length; nervulus postfurcal by about 0.3 its length; nervellus broken near its lower 0.4; dorsal end of prepectal carina at level of midheight of hind margin of pronotum, far from front edge of mesopleurum; sternaulus a short, broad, weak impression; metapleurum covered with dense small punctures; propodeum rather short, its apical half abruptly declivous; longitudinal propodeal carinae complete but the transverse carinae mostly absent, the costula absent (in the species at hand), and the areola and median basal area always confluent; propodeal spiracle elongate; legs relatively slender; second trochanter of front and middle legs almost completely fused with its femur; spurs of middle tibia elongate, of approximately equal length; tarsal claws apparently simple; abdomen a little widened toward apex; first tergite about 2.1 as long as wide, broad at base, its spiracle near its basal 0.18, in profile with a straight dorsal edge and an oblique basodorsal edge, the two edges meeting in a sharp, 120-degree angle; longitudinal carinae of first tergite strong and sharp to the apex, the median ones converging to the basodorsal angle, thence running closely parallel to the apex; second tergite with a pair of strong, median dorsal carinae, which in the species at hand are closely parallel and continue to the apex; third and fourth tergites with a single weak, incomplete, median dorsal carina; tergites three to six with an oblique, weak, basolateral groove which cuts off a small basolateral corner; epipleurum of first and second tergites vestigial, of third tergite narrowly wedge-shaped, of fourth to sixth tergites moderately wide and fully separated from their tergites by a crease; seventh tergite of both sexes retracted; female subgenital plate large, unspecialized.

The above description is based on an undescribed species from Burma, which is also the species illustrated in figure 173,a. After the paper was in galley proof we saw also the genotype (*tibialis*) from Europe, an undescribed species from Madagascar, another from Formosa, and (*Orthocentrus*) *Drepanoctonus bifasciatus* Brullé, 1846 (new combination), from Tasmania. The above generic description agrees in the main with these species, but not in all particulars.

14. Genus Leurus

FIGURE 173,b

Leurus Townes, 1946, Bol. Ent. Venezolana, vol. 5, p. 59. Type: *Exochus caeruliventris* Cresson; original designation.

Front wing 5.0 to 6.7 mm. long; punctures on face very coarse, on rest of head and body mostly rather small and weak; combined face and clypeus roundly convex; upper margin of face produced medially as a strong triangular point; face without a median carina or process; temple convex, rather short; head in profile sloping obliquely from hind margin of hind ocelli to occipital carina; occipital carina strong dorsally, weaker laterally, and sometimes absent ventrally; cheek about 0.5 as long as basal width of mandible; mandible large, rectangular, with its apex abruptly tapered and a carina along its lower margin, its upper tooth of moderate length, its lower tooth very short; labrum concealed; flagellum rather short, filiform; upper edge of pronotum wide, broadly rounded; propleurum weakly convex; scutellum moderately convex, without lateral carina; areolet small, subtriangular, stalked above; nervulus postfurcal by about 0.45 its length; nervellus broken near its lower 0.35; prepectal carina strong, ending dorsally at front end of subtegular ridge; sternaulus not distinct; metapleurum polished, impunctate; propodeum rather long, its apical part abruptly declivous; propodeal carinae complete except that costula is absent and areola and median basal area confluent; propodeal spiracle long oval, large; legs stout; base of hind coxa extending posterior to its socket as a strong shoulder; second trochanter of front and middle legs completely fused with its femur; spurs of middle tibia of equal length; tarsal claws apparently simple; abdomen approximately parallel-sided; first tergite rather broad basally, its lateral carinae strong to apex, its median carinae strong basally, fading out near apical 0.67; second tergite without median carinae; epipleurum of first two tergites very narrow, of third and following tergites wide; seventh tergite not retracted in either sex; female subgenital plate large, unspecialized.

This genus contains the genotype and an undescribed species from Brazil. In the original description of *Leurus* it was stated that the genus contained the genotype and two very distinct, unnamed Nearctic species. The two unnamed species referred to are now placed in the genus *Carria*, and *Leurus* is restricted to species very closely related to the genotype.

1. Leurus caeruliventris (Cresson)

FIGURE 173,b

Front wing 5.0 to 6.7 mm. long; combined face and clypeus about 0.95 as wide as high, with very coarse, regular, subadjacent punctures and no transverse wrinkling; outer face of mandible moderately convex, its lower edge margined; thorax about 1.75 as long as high; opening of propodeal spiracle about 4.0 as long as wide; median dorsal carinae of first tergite extending about 0.65 its length; abdomen weakly depressed; second abdominal tergite about 0.72 as long as wide.

Black, the abdomen with weak dark blue iridescence. Apical half of mandible largely ferruginous; palpi pale stramineous; scape variously colored, according to the subspecies; apex of pedicel light brown; tegula white basally, fulvous apically; apex of front and middle femora, upper side of front tibia, basal 0.4 (below) to basal 0.6 (above) of middle tibia, extreme apex of middle tibia, basal 0.6 of hind tibia, tibial spurs, first and often the second segment of front tarsus, middle tarsus except apically, and hind tarsus except as noted under the subspecies, ivory white; front coxa black, the apical part fulvous; front trochanter and femur except at apex fulvous to brown; under side of front tibia and front tarsus beyond the first or second segment, fulvous; middle coxa, trochanter, femur except at apex, and tibia except as noted otherwise, fulvous to black, the darker shades occurring most frequently on the coxa and femur in female rather than in male specimens; apex of middle tarsus fulvous to brown; apical one or two segments of hind tarsus fulvous to black; apex of first three segments of hind tarsus often dark.

There is a Nearctic and a Neotropic subspecies, separable on the color of the scape and of the hind tarsus:

1. Scape above ivory to pale fulvous; first three segments of hind tarsus usually whitish, with brownish to black apices, range: Neotropic region.
1a. caeruliventris caeruliventris (Cresson)
Scape above brown, first three segments of hind tarsus entirely whitish; range: Nearctic region . . . . **1b. caeruliventris borealis,** new subspecies

1a. Leurus caeruliventris caeruliventris (Cresson)

Exochus caeruliventris Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 38; "♂" = ♀. Lectotype: ♀, Córdoba, Mexico (Philadelphia).

Leurus caeruliventris Townes, 1946, Bol. Ent. Venezolana, vol. 5, p. 59; generic position.

Scape ivory colored apically and on the entire lower side, the rest pale fulvous; apex of first three segments of hind tarsus usually darkened, light brown to black; fourth and fifth segments of hind tarsus black.

Specimens: 2♂, 1♀, Nova Teutonia, Santa Catarina, Brazil, May 2, 1948 and July 7, 1940, Fritz Plaumann (Townes). ♂, Demerara River, British Guiana, June 23, 1927 (Ithaca). ♂, Port Parker, Costa Rica, July 4, 1932, W. Willow, Jr. (San Francisco). ♂, Balzapamba at 700 meters, Ecuador, June 5, 1938, Wm. Clarke-MacIntyre (Townes). ♂, Rio Blanco at 1,900 meters, Ecuador, June 1949, Wm. Clarke-MacIntyre (Townes). ♀, on a banana ship from Honduras (Washington). ♀ (type), Córdoba, V. C., Mexico (Philadelphia). ♂, Córdoba, V. C., Mexico, Dec. 24, 1907, Frederick Knab (Washington). ♂, Villa Rica, Paraguay, August, F. Schade (Cambridge). ♂, 2♀, San Pedro de Montes de Oca, Puerto Rico, Oct. 12, 1935, C. H. Ballou (Washington). ♀, St. Augustine, Trinidad, Apr. 17, 1935, N. A. Weber (Cambridge). ♀, Puerto Cabello, Venezuela, Feb. 12, 1940, P. J. Anduze (Townes). ♂, ♀, Tobay at 1,640 meters, Merida, Venezuela, September 1942, P. J. Anduze (Townes).

This subspecies is tropical, ranging from southern Mexico to southern Brazil.

1b. Leurus caeruliventris borealis, new subspecies

Scape ivory colored apically and on the entire lower side, the rest brown to blackish; first three segments of hind tarsus uniformly whitish; fifth segment of hind tarsus and usually the fourth segment blackish.

Type: ♀, Takoma Park, Md., Aug. 9, 1943, H. and M. Townes (Washington, USNM 63636).

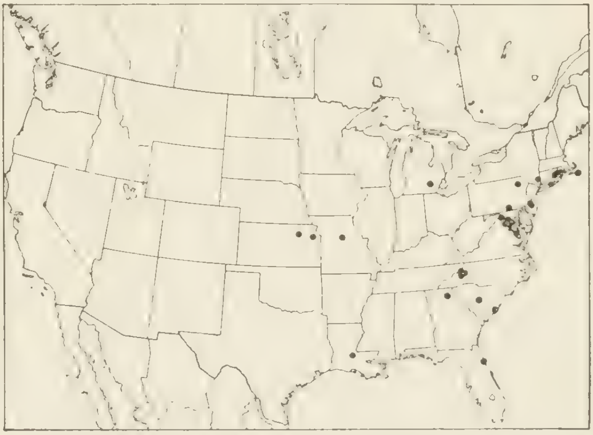


FIGURE 91.—Localities for *Leurus caeruliventris borealis.*

Paratypes (42♂, 28♀): From Alabama (Coleta); Connecticut (Ledyard and North Stonington); District of Columbia (Washington); Florida (Daytona); Georgia (Demorest); Kansas (Lawrence and Riley Co.); Louisiana (Opelousas); Maryland (Glen Echo and Takoma Park); Massachusetts (Nantucket); Michigan (Ann Arbor); Missouri (Columbia); New Jersey (Moorestown and Riverton); New York (Poughkeepsie and Riverhead); North Carolina (Crabtree Meadows at 3,600 ft. in Yancy Co., Craggy Gardens at 5,300 ft. in Buncombe Co., and Hamrick); Pennsylvania (Arendtsville and Spring Brook); Rhode Island (Buttonwoods and Westerly); South Carolina (Columbia and McClellanville); Virginia (Falls Church and Westmoreland State Park in Westmoreland Co.); and West Virginia (Bolivar).

Most of the collecting dates are from the middle of June to the end of August. Especially early and late seasonal dates of interest are: April 12 at Daytona, Fla.; May 10 at McClellanville, S. C.; "May 26 to June 8" at Columbia, Mo.; June 10 at Falls Church, Va.; June 11 at Westerly, R. I.; September 2 at North Stonington, Conn.; September 6 at Riverhead, N. Y.; September 11 at Takoma Park, Md.; September 15 at Riverton, N. J.; September 21 at Arendtsville, Pa.; and September 24 at Bolivar, W. Va.

A male without a locality was reared from *Desmia funeralis*.

We have collected the species many times in the underbrush of open deciduous woods.

This subspecies occurs in the Carolinian and Austroriparian faunas. It is in the adult stage mostly from early to late summer.

15. Genus Seticornuta

FIGURE 174,a

Megatrema Cameron, 1907, Zeitschr. Hymen. Dipt., vol. 7, p. 468; name preoccupied. Type: *Megatrema albopilosa* Cameron; monobasic.

Seticornuta Morley, 1913, Fauna of British India, including Ceylon and Burma, Hymenoptera, vol. 3 (1), p. 310; new synonymy. Type: (*Seticornuta albicalcar* Morley) = *albopilosa* (Cameron), new synonymy; original designation.

Front wing 3.7 to 10 mm. long; body punctation moderately coarse but shallow; combined face and clypeus roundly convex; upper margin of face produced medially as a blunt triangular point between bases of antennae; frons without a median process or carina; temple rather short, more or less convex; head in profile sloping obliquely from hind margin of hind ocelli to occipital carina; occipital carina moderately strong above, weaker laterally, absent below; cheek about 0.4 as long as basal width of mandible; mandible rather large, a little narrowed apically, its lower tooth much smaller than upper tooth; labrum either somewhat projecting or hidden beneath clypeus; flagellum of moderate length, filiform or a little enlarged basally; upper part of pronotum somewhat swollen, rounded off to the upper margin; propleurum weakly convex; scutellum weakly convex, without lateral carina; areolet rather small, subtriangular, stalked above; nervulus interstitial to postfurcal by about 0.6 its length; nervellus broken at its lower 0.15 to 0.3, or sometimes not broken; prepectal carina strong, its upper end joining front end of subtegular ridge; sternaulus absent; metapleurum polished, mostly impunctate; propodeum rather long, abruptly declivous apicad of its apical transverse carina; propodeal carination complete except that costula is lacking and areola and median basal area are confluent; propodeal spiracle large, elongate; legs stout; base of hind coxa extending posterior to its socket as a strong shoulder; second trochanter of front and middle legs completely fused with its femur; front spur of middle tibia a little longer or a little shorter than hind spur; tarsal claws apparently simple; abdomen approximately parallel-sided; first tergite broad at base, its spiracle near its basal 0.3 and just above its lateral longitudinal carina; lateral longitudinal carina of first tergite strong to apex; median longitudinal carinae of first tergite strong basally, usually fading out beyond the middle; second tergite without dorsal carinae; epipleurum of first tergite vestigial or sometimes moderately large; epipleurum of second and following tergites very wide, usually overlapping medially; seventh tergite not retracted in either sex; female subgenital plate concealed by the epipleura.

The typical members of *Seticornuta* occur in the Indo-Australian area and in Japan. In the Old World species the clypeal margin is a little convex and the labrum concealed; the two Nearctic species treated below seem referable to the genus, but differ from the gentoype and its close relatives in having the apical margin of the clypeus shalowly concave, exposing a rather large labrum:

Key to the Nearctic Species of Seticornuta

1. Flagellum with 25 to 30 segments; yellowish orbital border very narrow or interrupted above, not wide enough to touch lateral ocellus; hind femur blackish (ferruginous in one specimen from Missouri).
1. terminalis (Ashmead)

Flagellum with 21 to 25 segments; yellowish orbital border moderately wide above, touching the lateral ocellus; hind femur blackish or ferruginous.
2. apicalis (Cresson)

1. Seticornuta terminalis (Ashmead), new combination

FIGURES 174,a; 179,f

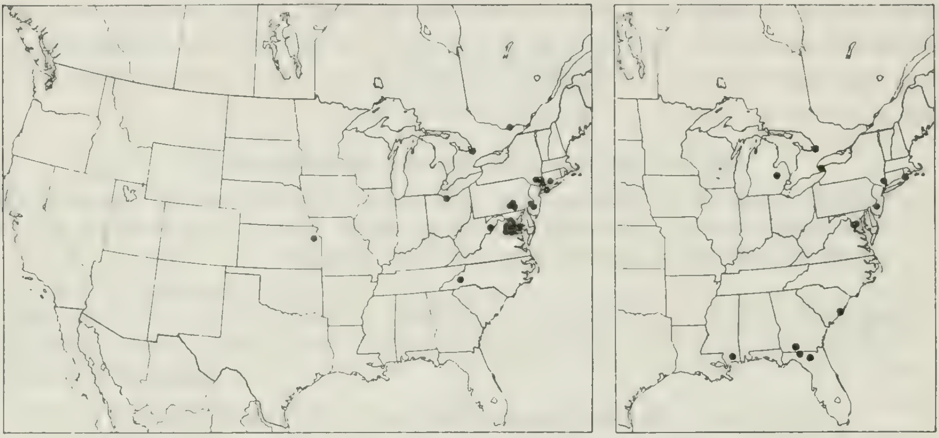
Triclistus terminalis Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 201; ♂. Type: ♂, Washington, D. C. (Washington).

Front wing 3.7 to 5.5 mm. long; flagellum with 25 to 30 segments; lateral longitudinal carina between spiracle and apical carina rather weak; front spur of middle tibia about 1.3 as long as hind spur.

Black. Face, cheek, mouth parts, and side of frons yellowish, the clypeus, adjacent part of face, and sometimes cheek and mouth parts covered by a transversely oblong brown area; yellow on frons moderately wide below, tapered dorsally to a slender point; hind orbit often narrowly fulvous, this hind orbital mark usually not joining frontal orbital mark at top of eye, or when there is a junction it is narrow, not wide enough to reach lateral ocellus; antenna brown; tegula yellow, with a broad, transverse, postmedian brown area; front leg beyond coxa brownish to ferruginous; front and middle tibiae brown to blackish, with a small dorsobasal pale mark; tibial spurs whitish; abdomen beyond fifth segment ferruginous.

One specimen from Missouri (♂, Hannibal, June 8, 1948, H. Townes (Townes)) has the legs beyond the coxae ferruginous, except that the tibial spurs are whitish. It may represent a separate subspecies.

Specimens (202♂, 24♀): From Connecticut (New Haven); District of Columbia (Washington); Kansas (Lawrence); Maryland (Chesapeake Beach, Glen Echo, Plummers Island, and Takoma Park); New Jersey (Moorestown); New York (Barrytown, Farmingdale, Kingston, Poughkeepsie, and Westchester Co.); North Carolina (Mount Mitchell); Ohio (Cedar Point at Sandusky); Ontario (Angus); Pennsylvania (Highspire, Marsh Run in York Co., Mount Holly Springs, "New Cumberland," and Philadelphia); Quebec (Aylmer); Virginia (Arlington, Big Meadows near Shenandoah, Mount Vernon, near Plummers Island in Maryland, and Rosslyn); and West Virginia (Lost River State Park).



Figures 92, 93.—Localities: 92 (left), *Seticornuta terminalis;* 93 (right), *S. apicalis.*

Collection dates are all in the summer. Early and late dates are: June 7, 14, and 21 at Takoma Park, Md.; June 19 at Lawrence, Kans.; June 24 at Farmingdale, N. Y., at Moorestown, N. J., and at Chesapeake Beach, Md.; June 25 at Glen Echo, Md.; August 24 on Mount Mitchell, N. C.; August 25 at Poughkeepsie, N. Y.; August 26 at Aylmer, Que.; August 27 in Westchester County, N. Y., and in Virginia near Plummers Island, Md.; and September 1 at Mount Holly Springs, Pa.

One specimen was reared, a male from a "tortricid" at Angus, Ont., in 1944.

In our experience the species is sporadic, but when found is often common. We have swept it in several localities from weeds and grass under groves of *Robinia pseudoacacia.*

This species is in the Carolinian and Alleghenian faunas. Adults occur from late in June to the first of September.

2. Seticornuta apicalis (Cresson), new combination

Exochus apicalis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol 3, p. 285; "♂"=♀. Type: ♀, Illinois (Philadelphia).

Front wing 4.7 to 5.9 mm. long; flagellum with 21 to 25 segments; lateral longitudinal carina of propodeum between spiracle and apical carina moderately sharp; front spur of middle tibia about 1.25 as long as hind spur.

Black. Face, cheek, mouth parts, and broad complete orbit that is wide enough dorsally to reach lateral ocellus, yellowish and fulvous, the yellow mostly on front oribit and upper part of face; central part of face blackish to light brown; antenna brown; tegula yellow, with a broad, transverse, postmedian brown area; legs colored either as in *Seticornuta terminalis* or more commonly ferruginous beyond coxae, the tibial spurs whitish; abdomen beyond fifth segment ferruginous.

Specimens (20♂, 25♀): From District of Columbia; Florida (Lake City and Monticello); Georgia (Thomasville); Illinois; Maryland (Takoma Park); Michigan (Genesee Co.); Mississippi (Wiggins); Nebraska; New Jersey (Moorestown); New York (Poughkeepsie); Ohio; Ontario (Angus and Vineland Station); Rhode Island (Westerly); South Carolina (McClellanville); and Virginia (Great Falls).

The specimens were collected in May, June, and July, and there is one collection in August. Early and late seasonal records of interest are: May 9 at Monticello, Fla.; May 11 in Genesee Co., Mich.; May 15 at McClellanville, S. C.; June 1 at Wiggins, Miss.; June 10 at Westerly, R. I.; July 28 at Angus, Ont.; July 31 at Vineland Station, Ont.; and Aug. 2 at Poughkeepsie, N. Y.

A large portion of the specimens were reared, as follows: 4♂, from *Acrobasis sylviella* on *Ostrya virginiana*, Vineland Station, Ont., July 29, 30, and 31, 1940, W. L. Putman. ♀, from *Acrobasis betulella*, Angus, Ont., July 28, 1939. ♂, from *Acrobasis indigenella*, Monticello, Fla., May 13, 1913, John B. Gill. ♂, ♀, from *Acrobasis indigenella*, Thomasville, Ga., June 16, 1916, and no date, W. F. Turner. 8♂, 10♀, from *Acrobasis juglandis*, Monticello, Fla., May and June, 1945, A. M. Phillips. ♂, from *Acrobasis juglandis*, Lake City, Fla., June 1905. ♀, from *Acrobasis juglandis*, Wiggins, Miss., June 3, 1929, J. P. Kilanko. ♂, from *Acrobasis caryivorella*, Monticello, Fla., 1941, W. C. Pierce.

This species occurs in the Austroriparian and Carolinian faunas. Adults occur in late spring to mid-summer. Species of *Acrobasis* serve as hosts.

16. Genus Carria

FIGURE 174,b

Carria Schmiedeknecht, 1924, Ent. Monthly Mag., vol. 60, p. 112.

Type: *Carria paradoxa* Schmiedeknecht; monobasic.

Front wing 3.3 to 5.0 mm. long; body punctures rather small, moderately dense; body shape rather strongly depressed; combined face and clypeus very short, broad, and strongly convex in profile; upper margin of face produced between bases of antennae as a very short, broad point; frons without a median carina or process; temple strongly convex; head in profile sloping obliquely from hind margin of hind ocelli to the point usually occupied by occipital carina; occipital carina entirely lacking; cheek about 0.5 as long as basal width of mandible; mandible large, its upper tooth large and lower tooth very short; labrum concealed under clypeus; flagellum short, filiform; upper part of pronotum swollen, rounded off to the upper margin; propleurum weakly convex; scutellum almost flat, without lateral carina; areolet subtriangular, sessile above or stalked; nervulus postfurcal by about 0.5 its length; nervellus not broken, inclivous; prepectal carina complete, its dorsal end joining front end of subtegular ridge; sternaulus absent; propodeum elongate, abruptly declivous at apical transverse carina, most of its carinae present except that costula is always absent and areola and median basal area are confluent; propodeal spiracle subcircular; metapleurum polished, impunctate; legs short, stout; base of hind coxa extended behind its socket as a prominent shoulder; second trochanter of front and middle legs almost completely fused with its femur; front spur of middle tibia a little longer than hind spur; tarsal claws apparently simple; abdomen parallel-sided; first tergite moderately broad at base, its lateral longitudinal carina strong and complete to its apex, its median longitudinal carinae of variable development, usually strong basally and fading out near apex; second tergite without dorsal carinae; epipleura of first two tergites vestigial, of third and following tergites moderately wide; female subgenital plate weakly sclerotized, unspecialized.

This genus includes only a species in England, a species in New Zealand, and the two Nearctic species described below:

Key to the Nearctic species of Carria

1. Median dorsal carinae of first tergite extending to about middle of the tergite; third lateral area of propodeum approximately vertical, its dorsal edge not more posterior than its ventral edge; lower edge of mandible not margined (fig. 182, i); body less flattened . . . . **1. dreisbachi,** new species

Median dorsal carinae of first tergite extending almost or quite to its apex; third lateral area of propodeum somewhat inflexed, so that its dorsal edge is much more posterior than its ventral edge; lower edge of mandible margined (fig. 182, j); body more flattened . . . . . **2. inculcata,** new species

1. Carria dreisbachi, new species

Figures 174,b; 182,i

Front wing 3.5 to 5.0 mm. long; combined face and clypeus 1.4 to 1.7 as wide as high, with coarse subadjacent punctures and centrally with a tendency to transverse wrinkling between the punctures; outer face of mandible weakly convex, its upper and lower edges not margined, about 2.55 as long as wide; thorax about 2.0 as long as high; third lateral area of propodeum subvertical; opening of propodeal spiracle approximately circular; median dorsal carinae of first tergite ending at about 0.4 to 0.65 its length; abdomen depressed basally, apically subcylindric in male, somewhat compressed in female; second abdominal tergite 0.90 to 1.25 as long as wide.

Black. Apical half of mandible more or less ferruginous; palpi pale fulvous; tegula yellowish to fulvous; legs light ferruginous, their coxae partly blackish and the femora and tibiae sometimes more or less infuscate.

There are three subspecies, as keyed and described below:

1. Hind femur ferruginous with a weak infuscation to strongly infuscate, uncommonly clear ferruginous; hind coxa entirely black or with the apex ferruginous, uncommonly with as much as the apicoventral third ferruginous; range: Mountains of Colorado, Arizona, and New Mexico. **1b. dreisbachi montana,** new subspecies
   Hind femur clear ferruginous; hind coxa almost entirely black to mostly ferruginous. 2
2. Second abdominal tergite about 0.90 as long as wide; range: Alleghenian and Carolinian faunas. . . . . **1a. dreisbachi dreisbachi,** new subspecies
   Second abdominal tergite about 1.1 as long as wide in male, about 1.2 as long as wide in female; range: Sierra Nevada of California. **1c. dreisbachi californica,** new subspecies

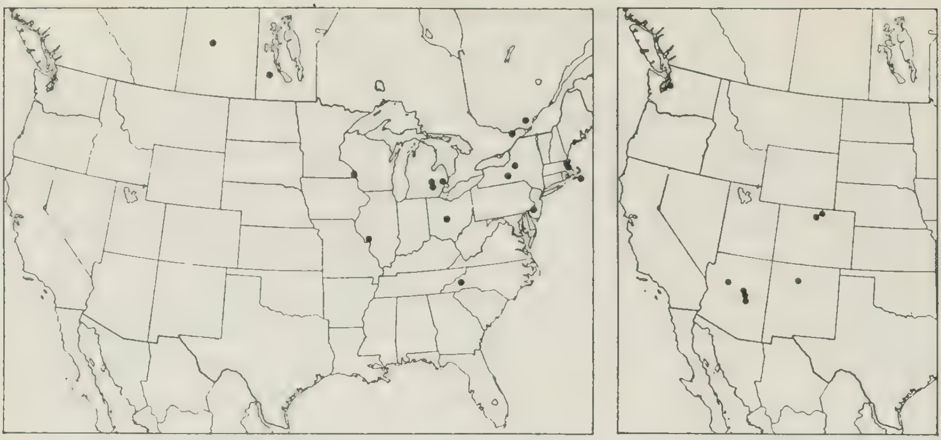
1a. Carria dreisbachi dreisbachi, new subspecies

Second abdominal tergite about 0.90 as long as wide; outer face of mandible with moderately coarse punctures.

Legs light ferruginous. Middle coxa sometimes more or less blackish basally and above, but always ferruginous beneath; hind coxa varying between having the basal hind part infuscate and all but the ventroapical third infuscate.

Type: ♀, Genesee Co., Mich., June 3, 1950, R. R. Dreisbach (Dreisbach).

Paratypes: ♀, Elsah, Ill., May 7, 1943, D. Starrett (Washington). ♀, Riding Mt. Park, Man., June 15, 1938, W. J. Brown (Ottawa). ♂, Blue Hills, Mass., June 3, 1916 (Cambridge). ♀, Milton, Mass., June 9, 1901 (Cambridge). ♀, Nantucket, Mass., July 25, 1928, C. W. Johnson (Cambridge); ♂, Ann Arbor, Mich., May 27, 1901 (Ann Arbor). ♀, Livingston Co., Mich., June 3, 1950, R. R. Dreisbach



FIGURES 94, 95.—Localities, subspecies of *Carria dreisbachi:* 94 (left), *dreisbachi;* 95 (right), *montana.*

(Dreisbach). ♀, Macomb Co., Mich., May 28, 1949, R. R. Dreisbach (Dreisbach). ♀, Winnebago Valley, Houston Co., Minn., May 31, 1941, C. E. Mickel (St. Paul). 2♀, Moorestown, N. J., June 11, 1939, H. and M. Townes (Townes). ♂, Ithaca, N.Y., May 31, 1936, H. Townes (Townes). ♀, Six Mile Creek, Ithaca, N. Y., May 29, 1937, P. P. Babiy (Townes). ♂, Waterville, N. Y. (Ithaca). ♀, Black Mts., N. C., May (New York). ♀, Columbus, Ohio, May 30, J. N. Knull (Washington). ♀, Bells Corners, Ont., May 14, 1941, G. S. Walley (Ottawa). 2♂, St. Agathe, Que., May 26, 1929, A. Seyrig (Washington). 3♀, Saskatoon, Sask., May 19 and 23, 1940, A. R. Brooks (Ottawa). ♀, no data (Ottawa).

This subspecies is in the Alleghenian and Carolinian faunas. Adults occur in spring.

1b. Carria dreisbachi montana, new subspecies

Second abdominal tergite about 0.90 as long as wide; outer face of mandible with moderately coarse punctures.

Legs light ferruginous. Front and middle coxae usually infuscate basally and above, ferruginous below, rarely entirely ferruginous; front and middle coxae of female fuscous, the front coxa and usually the middle coxa apically more or less ferruginous; hind coxa entirely blackish or apically ferruginous, the ferruginous color occupying as much as a third of its area; hind femur usually more or less infuscate, varying from clear ferruginous to strongly infuscate; rest of legs varying from clear ferruginous to brownish, paler than the hind femur.

Type: ♀, near Estes Park, Colo., June 12, 1948, H., M., G., D., and J. Townes (Washington, USNM 63637).

Paratypes: 5♂, Parker Creek, Sierra Ancha, Ariz., Apr. 19 and 26, 1947, H. and M. Townes (Townes). ♀, Pocket Creek, Sierra Ancha, Ariz., May 5, 1947, H. and M. Townes (Townes). ♂, Workman Creek, Sierra Ancha, Ariz., Apr. 30, 1947, H. and M. Townes (Townes). ♀, Williams, Ariz., May 30, Barber and Schwarz (Washington). 23♂, 3♀, same data as type (Townes). 3♀, Fort Collins, Colo., May 24, 1896 and June 15, 1896, C. F. Baker (Washington). ♂, ♀, "Howe's Gulch," Colo., May 7, 1896, C. F. Baker (Washington). ♂, Jemez Springs, N. Mex., July 1, 1941, R. H. Beamer (Lawrence).

A female specimen from Bothell, Wash., collected by "E. C. C." May 4, 1939 (Madison) is intermediate between this subspecies and *C. d. californica*.

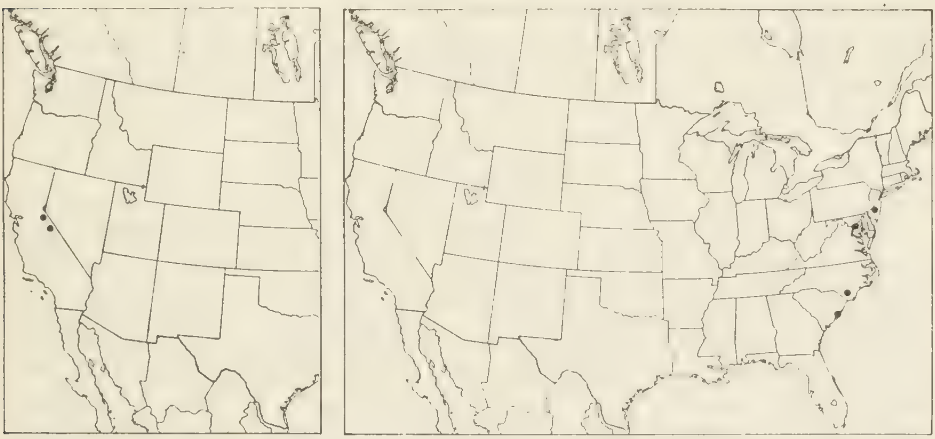
This subspecies is found in the Rocky Mountain area. Adults occur in spring and early summer.

1c. Carria dreisbachi californica, new subspecies

Second abdominal tergite about 1.1 as long as wide in male, about 1.2 as long as wide in female; outer face of mandible with rather fine punctures.

Legs ferruginous. Coxae blackish, the front and middle coxae more or less ferruginous below.

Type: ♀, Leevining, Calif., June 25, 1948, H., M., G., and D. Townes (Washington, USNM 63638).



FIGURES 96, 97.—Localities: 96 (left), *Carria dreisbachi californica;* 97 (right), *C. inculcata.*

Paratypes: 2♀, Leevining, Calif., June 22 and 24, 1948, H., M., G., and D. Townes (Townes). ♂, near Sonora Pass at 8,000 ft., Calif., July 6, 1948, H., M., G., and D. Townes (Townes).

This subspecies occurs in the eastern part of the Sierra Nevada.

2. Carria inculcata, new species

Figure 182,j

Front wing 3.3 to 3.8 mm. long; combined face and clypeus about 1.4 as wide as high, with coarse, regular, subadjacent punctures and no transverse wrinkling; outer face of mandible rather flat but its upper and lower edges margined and slightly raised; mandible about 2.5 as long as wide; thorax about 2.1 as long as high in male, about 2.6 as long as high in female; third lateral area of propodeum inflexed basally, so that its upper edge is considerably posterior to its lower edge; opening of propodeal spiracle approximately circular; median dorsal carinae of first tergite extending to its apex, or ending at least beyond 0.8 its length; abdomen depressed, in the female a little compressed apically; second abdominal tergite about 0.85 as long as wide in male, about 0.98 as long as wide in female.

Black. Antenna brown; mandible entirely black; palpi, tegula, and legs fulvous, the hind part of hind coxa, and hind femur and hind tibia apically above, infuscate.

Type: ♀, Takoma Park, Md., Aug. 22, 1943, H. and M. Townes (Washington, USNM 63639).

Paratypes: ♀, Moorestown, N. J., June 28, 1939, H. and M. Townes (Townes). ♀, Elizabethtown, N. C., May 30, 1950, H. Townes (Townes). ♂, ♀, Takoma Park, Md., Aug. 15 and 25, 1943, H. and M. Townes (Townes). ♂, McClellanville, S. C., May 16, 1944, H. and M. Townes (Townes).

This species is in the Carolinian and Austroriparian faunas of the Atlantic States. Adults occur from late spring through summer.

17. Macromalon, new genus

Figure 175,a

Front wing 4.3 to 4.5 mm. long; body punctures small, sharp, and dense; combined face and clypeus elongate, convex transversely, in profile almost flat, with a broad weak depression between the face and clypeus; upper margin of face produced between antennal sockets as a very short, broad point; frons without a median carina or process; temple convex; head in profile rounded off from hind ocelli to occipital carina; occipital carina moderately strong above, weak laterally, absent below; cheek about 1.6 as long as basal width of mandible; mandible small, narrow, tapered toward apex, its lower tooth shorter than upper tooth; labrum concealed; flagellum moderately long, slender, filiform; pronotum a little swollen near its upper margin; propleurum weakly convex; scutellum rather strongly convex, without lateral carina; areolet absent; intercubitus separated from second recurrent by about 0.75 its length; nervulus postfurcal by about 0.3 its length; nervellus inclivous, weakly broken just above its lower end; prepectal carina complete, its dorsal end joining front end of subtegular ridge; sternaulus a broad, shallow, moderately long impression; metapleurum subpolished, with moderately dense punctures all over; propodeum of moderate length, convex in profile but more sharply declivous beyond apical transverse carina, its carination complete except that costula is lacking and areola and median basal area confluent; propodeal spiracle small, circular; legs moderately stout; base of hind coxa extending very little behind its socket; spurs of middle tibia of equal length; tarsal claws apparently simple; abdomen narrow basally, widened apically; first tergite rather narrow at base, its spiracle near its basal 0.3, its lateral longitudinal carina strong to the apex, its median longitudinal carinae present only on basal 0.35; second tergite without dorsal carinae; epipleura of first through third tergites vestigial, of fourth through sixth tergites narrow; female subgenital plate weakly sclerotized, unspecialized.

Genotype: *Macromalon montanum*, new species.

The generic name is from the Greek "macros" (long) plus "malon" (cheek), referring to the distance between the eye and the mandible.

There is a single known species, from the mountains of Colorado.

Macromalon montanum, new species

FIGURE 175,a

Front wing 4.3 to 4.5 mm. long; structure as shown in the figure and as described under the genus.

Black. Palpi stramineous to dark brown; tegula whitish in front, the rest fulvous to blackish brown; front and middle coxae and first trochanters fulvous to blackish; front and middle femora fulvous or more or less blackish, yellowish at base and apex; front and middle tibiae and tarsi fulvous, the tarsi more or less infuscate; hind coxa, first trochanter, and femur black or blackish brown; hind second trochanter yellowish; hind tibia brown, with a broad, indefinite, premedial pale band; hind tarsus light brown, the basal half of its basitarsus paler; abdomen entirely black or the apical 0.4 ± of second and following tergites more or less fulvous.

Type: ♀, Poudre Lake at 11,000 ft. in Rocky Mountain National Park, Colo., Aug. 11, 1948, H., M., G., D., and J. Townes (Washington, USNM 63682).

Paratypes: ♀, Gothic at 9,500 ft., Colo., July 18, 1934, C. P. Alexander (Townes). ♂, Phantom Valley at 9,400 ft., Rocky Mountain National Park, Colo., June 17, 1948, G., D., and J. Townes (Townes).

18. Genus Hypsicera

FIGURE 176,a

Hypsicera Latreille, 1829, *in* Cuvier, Règne animal . . . , nouvelle édition, vol. 5, p. 288. Type: (*Alomya* (*Hypsicera*) sp. near *femoralis* Gravenhorst) = *femoralis* (Fourcroy); monobasic.

Metacoelus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 161. Type: (*Exochus femoralis* Gravenhorst) = *femoralis* (Fourcroy); designated by Viereck, 1914.

Polyclistus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 161. Type: *Ichneumon femoralis* Fourcroy; designated by Viereck, 1912.

Plesioexochus Cameron, 1905, Trans. South African Philos. Soc., vol. 15, p. 102. Type: (*Plesioexochus rufipes* Cameron) = *femoralis* (Fourcroy); monobasic.

Front wing 2.25 to 6.5 mm. long; body punctures fine, moderately close; combined face and clypeus strongly convex transversely, weakly convex longitudinally, sloping forward from mouth to near antennal sockets; upper edge of face produced between antennal sockets as a short broad point which is bent backward a little between bases of antennae; temple convex; back of head dropping vertically from hind margin of hind ocelli to foramen magnum; occipital carina weak or absent laterally, absent above and below; cheek about 1.1 as long as basal width of mandible; mandible rather small, moderately wide basally, the rest narrow; lower tooth of mandible much shorter than upper tooth; apical edge of labrum protruding a little beyond clypeus; flagellum rather short to long, filiform, slender to thick; upper part of pronotum strongly swollen, rounded off to upper margin; propleurum weakly convex; scutellum weakly convex, without a lateral carina; areolet absent; intercubitus separated from second recurrent by about 0.75 its length; nervulus strongly postfurcal, usually by about 0.6 its length; nervellus broken near its lower 0.3; prepectal carina complete, ending dorsally at front end of subtegular ridge; sternaulus broad, moderately long; metapleurum with a groove next to pleural carina which contains a row of short hairs, otherwise polished and impunctate except sometimes for a few hairs near its dorsal margin; propodeum rather long, abruptly declivous at apical transverse carina, with all carinae, except that usually the carina dividing median basal area from areola is lacking and that in a few species the costula is also lacking; propodeal spiracle usually elongate but sometimes subcircular; legs stout to very stout; base of hind coxa projecting behind its socket as a weak shoulder; second trochanter of front and middle legs fused with its femur; spurs of middle tibia of approximately equal length; tarsal claws pectinate or apparently simple; abdomen a little widened medially; first tergite rather narrow basally, its spiracle near its basal 0.35, its lateral longitudinal carina sharp, usually to the apex, its median longitudinal carinae sharp basally, usually obsolescent somewhere beyond the midlength of the tergite; epipleura of first two tergites vestigial, of third and following tergites wide; seventh tergite not retracted in either sex; female subgenital plate large, weakly sclerotized, unspecialized.

Four Nearctic species of *Hypsicera* are described here. Of these, two are introduced species which occur around buildings. The other two are native. The native ones are very scarce in collections. No species of the genus, except for the cosmopolitan *H. femoralis*, and *H. curvator* are known from the Neotropics. In contrast to the poor representation in the New World, there are many species in the Old World Tropics, all with the costula present and propodeal spiracle elongate, thus showing relationship with *H. femoralis*.

Key to the Nearctic species of Hypsicera

1. Costula present and strong. 2
   Costula completely absent 3
2. Outer side of second lateral area of propodeum about 1.0 as long as inner side; propodeal spiracle long oval; first flagellar segment of female about 2.0 as long as wide and about 1.8 as long a second segment (fig. 182,e); front wing 3.8 to 5.0 mm. long; male scarce. . . . . **1. femoralis** (Fourcroy)
   Outer side of second lateral area of propodeum about 1.6 as long as inner side; propodeal spiracle circular; first flagellar segment of female about 0.8 as long as wide and about 0.9 as long as second segment (fig. 182,f); front wing 3.0 to 3.8 mm. long; male unknown . . . . **2. curvator** (Fabricius)
3. Head fulvous, the occiput brownish; front wing 3.7 mm. long. **3. fulviceps,** new species
   Head black, the upper part of face pale; front wing 2.25 to 2.85 mm. long. **4. cuneata,** new species

1. Hypsicera femoralis (Fourcroy)

FIGURES 176,a; 182,e

Ichneumon femoralis Fourcroy, 1785, Entomologia parisiensis, p. 396, ? ♀. Type: on window of home, ?Paris, France (lost).

Exochus laevis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 286; ♂, ♀. Lectotype: ♀, Illinois (Philadelphia).

Front wing 3.8 to 5.0 mm. long; head about 0.72 as long as high in male, about 0.83 as long as high in female; lateral ocellus of male separated from eye by about 0.9 its diameter; first flagellar segment of female about 2.0 as long as wide and about 1.8 as long as second flagellar segment; costula present, strong; outer side of second lateral area of propodeum about 1.0 as long as inner side; propodeal spiracle elongate; tarsal claws with a short pecten; second abscissa of radius about 0.7 as long as intercubitus; first tergite about 1.3 as long as wide in male, about 1.25 as long as wide in female; second tergite with fine, rather weak, rather close punctures but centrally the punctures very sparse or absent; male squama rather long, spatulate, and weakly convex; apex of penis without spines.

Black. Legs completely and uniformly ferruginous; face near antennal sockets ferruginous; antenna brown, paler below, the scape and pedicel of male very pale on under outer side; mandible ferruginous, infuscate basally; palpi pale fulvous; tegula fulvous; pronotum stained with fulvous next to tegula; male squama brown.

This species has many close relatives in the Oriental and Ethiopian regions. It was described first from Europe, but judging from its apparent habit of parasitizing Lepidoptera that infest stored products in buildings, and from the distribution of related species, this species probably originated in some warmer and drier part of the Old World and took up with man during his later history. It has now established itself in most parts of the world. Besides Nearctic material, we have seen it from Brazil, Formosa, Hawaii, and Europe. Some published records from parts of the Old World may be in error, as there are other species which resemble it very closely.

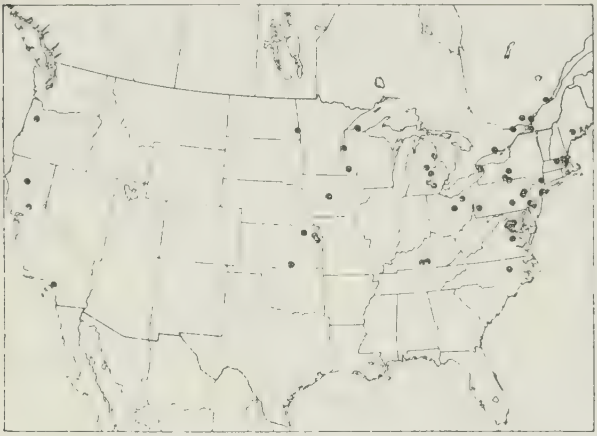


FIGURE 98.—Localities for *Hypsicera femoralis.*

Specimens (11♂, 141♀): From California (Davis, "Mokel Hill," Red Bluff, and Whittier); District of Columbia (Washington); Illinois; Iowa (Ames); Kansas (Baldwin City, Lawrence, Riley Co., and Wellington); Kentucky (Crailhope and Green Co.); Maine (Monmouth); Maryland; Massachusetts (Holliston, Melrose Highlands, Middlesex Fells, and Petersham); Michigan (Ann Arbor, Aurelius, East Lansing, Iosco Co., Midland Co., and Shiawassee Co.); Minnesota (Olmsted Co.); New Jersey (Moorestown); New York (Elmira, Flatbush, Ithaca, New York, Poughkeepsie, and Sea Cliff); North Carolina (Wake Co.); North Dakota (Fargo); Ohio (Summit Co. and Wooster); Ontario (Jordan, "Muskoka," Ottawa, Ridgeway, and Trenton); Oregon (Stayton); Pennsylvania (Hazelton, Highspire, Lehigh Gap, Philadelphia, Pittsburgh, and Wilawana); Quebec (Duchesnay, Hemmingford, Lac Mercier, and Lanoraie); Virginia (Arlington, Falls Church, Great Falls, Mechanicsville, and Vienna); Wisconsin (Polk Co. and Salmo in Bayfield Co.); Cyprus; Formosa; Hawaii; and Brazil.

Biological data associated with these specimens include notes that three of the collections were made on windows of buildings, one collection "at light" and one "from wheat stack." Dates of collection range throughout the warm part of the season, and since this is a largely indoor species it seems useless to give them in detail. Cresson's types of *Exochus laevis* seem to be the oldest specimens known from North America. The oldest with an actual date on the pin label is one from Muskoka, Ont., July 1888, collected by E. P. Van Duzee.

This is a cosmopolitan species which is collected usually on the windows of buildings. Presumably it parasitizes some stored product lepidopteran. Females are much commoner than males.

2. Hypsicera curvator (Fabricius), new combination

FIGURE 182,f

Ichneumon curvator Fabricius, 1793, Entomologia systematica . . ., vol. 2, p. 177; ♀. Type: ♀, Denmark (Copenhagen).

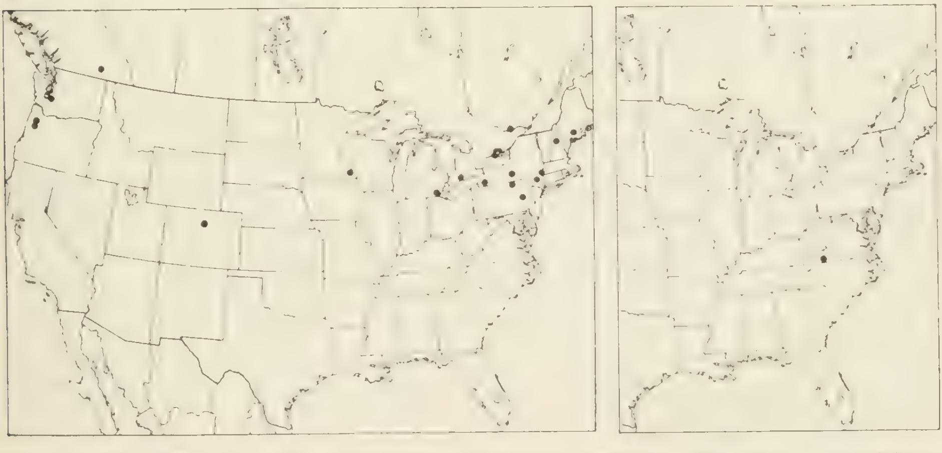
Ichneumon mansuetor Gravenhorst, 1807, Vergleichende Uebersicht des linneischen und einiger neuern zoologischen Systeme . . ., p. 254; new synonyny. Types: ♀♀, no locality given but probably from central Europe (Wroclaw); p. 254; new synonymy.

Hyperacmus tineae Riley, 1890, Insect life, vol. 2, p. 213; ♀. Types: ♀♀, Adrian, Mich. (Washington).

Hyperacmus ovatus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 218; ♀. Lectotype: ♀, Connecticut (Philadelphia).

Male: Unknown.

Female: Front wing 3.0 to 3.8 mm. long; head about 0.86 as long as high; first flagellar segment about 0.8 as long as wide, about 0.9 as long as second segment; costula present, strong; outer side of second lateral area of propodeum about 1.6 as long as inner side; propodeal spiracle circular; tarsal claws apparently simple; second abcissa of radius about 1.0 as long as intercubitus; first tergite about



FIGURES 99, 100.—Localities: 99 (left), *Hypsicera curvator;* 100 (right), *H. fulviceps.*

0.95 as long as wide; second tergite with uniformly spaced, moderate-sized punctures, their interspaces about 2.5 their diameter.

Black. Legs completely and uniformly ferruginous; face near antennal sockets stained with ferruginous; antenna brown, paler below; mandible ferruginous, infuscate basally; palpi and tegula fulvous; pronotum stained with fulvous next to tegula.

Specimens (72♀): From British Columbia ("Corfield" and Robson); Colorado (Boulder); Maine (Brunswick, Hancock, and Winthrop); Michigan (Adrian); Minnesota (Olmstead Co.); New Brunswick (Fredericton); New Hampshire (Mount Washington); New York (Bemus Point, Catskill Mts., Ithaca, and Onteora Mt. in Greene Co.); Nova Scotia (White Point Beach in Queens Co.); Ontario (Blackburn in Hastings Co., Maymouth in Hastings Co., St. Thomas, and Trenton); Oregon (Corvallis and Independence); Pennsylvania (Hazelton and Wilawana); Quebec (Aylmer); Washington (Ashford and Olympia); Belgium; and Germany.

Collection dates are all in June, July, and August except for one on March 12 at Trenton, Ont., and one on September 10 at Fredericton, N. B. The types of *Hyperacmus tineae* from Adrian, Mich., seem to be the first specimens collected in America. They are dated July 17 and 18, 1885. These were reared from *Tinea pellionella.* Four females from Fredericton, N. B. were reared from this same host Sept. 10, 1932, by G. P. Walker. We have collected the species on the window of a home at Ashford, Wash., infested with clothes moths. One specimen from Trenton, Ont. was collected "at light."

This is a cosmopolitan species which is sometimes collected on windows of buildings. It parasitizes clothes moths. Only female specimens are known.

3. Hypsicera fulviceps, new species

FIGURE 182,g

Female type: Front wing 3.7 mm. long; head 0.84 as long as high; first flagellar segment 2.3 as long as wide, 2.3 as long as second flagellar segment; costula entirely absent; median longitudinal carinae of propodeum exactly straight and parallel; propodeal spiracle circular; second abscissa of radius 1.1 as long as intercubitus; tarsal claws apparently simple; first tergite 1.45 as long as wide; punctures on second tergite moderately coarse, their interspaces about 1.5 their diameter, on apical 0.12 of tergite the punctures smaller and sparser.

Black. Head and its appendages fulvous, the frons yellowish basolaterally, the occiput brownish, and the flagellum brownish apically; tegula yellowish; pronotum narrowly yellowish next to tegula; legs fulvoferruginous.

Type: ♀, Galax, Va., Aug. 28, 1955, H. and M. Townes (Washington, USNM 63640).

4. Hypsicera cuneata, new species

FIGURE 182,h

Front wing of male about 2.25 mm. long, of female 2.7 to 2.85 mm. long; head of male about 0.80 as long as high, of female about 1.13 as long as high; lateral ocellus of male separated from eye by about 1.35 its diameter; first flagellar segment of female about 1.9 as long as wide, about 1.9 as long as second flagellar segment; costula entirely absent; median longitudinal carinae of propodeum straight, weakly divergent posteriorly; propodeal spiracle circular; second abscissa of radius about 1.0 as long as intercubitus; tarsal claws apparently simple; first tergite of male about 1.40 as long as wide, of female about 1.35 as long as wide; punctures on second tergite moderately large, rather weak, evenly distributed, their interspaces about 2.0 times their diameter.

There are two subspecies, distinguishable on color as keyed and described below:

1. Frons of male entirely black; female hind femur fulvous, tinged with brown; basal half of female flagellum light brown; range: Alleghenian fauna.
4a. cuneata cuneata, new subspecies

Frons of male pale yellow ventrolaterally; female hind femur brown; basal half of female flagellum medium brown; range: Alaska, Alberta, California, and Arizona . . . . **4b. cuneata opaca,** new subspecies

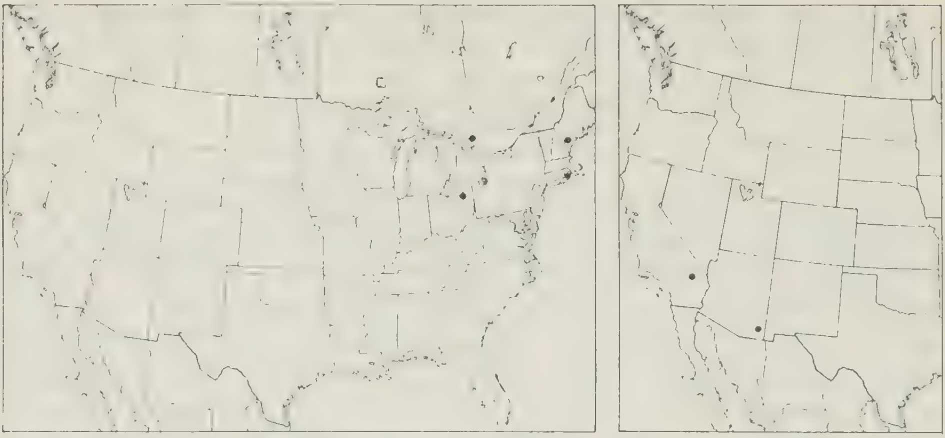
4a. Hypsicera cuneata cuneata, new subspecies

Male: Black. Upper third of face light fulvous or yellowish except laterally, ventrally shading into the blackish color of rest of face; antenna light brown basally, shading to dark brown apically; mandible brown; palpi stramineous; tegula yellow; pronotum next to tegula narrowly stained with fulvous; legs fulvous, the hind femur apically and hind tibia basally a little infuscate and the hind coxa basally stained with brown.

Female: Black. Face near antennal sockets strongly stained with fulvous; antenna light brown basally, shading to medium brown apically; mandible brown; palpi stramineous; tegula yellowish fulvous; pronotum next to tegula narrowly stained with fulvous; legs fulvous, the hind femur medially vaguely stained with brown and the hind coxa mostly brown.

Type: ♀, Westerly, R. I., Sept. 1, 1936, M. Chapman (Washington, USNM 63641).

Paratypes: ♂, Casco, Maine, Aug. 11, 1944, J. C. Bradley (Townes). ♀, Bemus Point, N. Y., Jul. 21, 1937, H. Townes (Townes). ♀,



FIGURES 101, 102.—Localities, subspecies of *Hypsicera cuneata:* 101 (left), *cuneata:* 102 (right), *opaca.*

Shaker Heights, Ohio, Aug. 26, 1939, E. D. McDonald (Townes). ♂, Waubamick, Ont., 1915, H. S. Parish (Ithaca). ♀, Westerly, R. I., Aug. 25, 1946, M. Townes (Townes).

This subspecies is known from Ontario and northeastern United States.

4b. Hypsicera cuneata opaca, new subspecies

FIGURE 182,h

Male: Black. Upper 0.65 of face and lower lateral part of frons pale yellow; scape and pedicel brown, the scape yellow below; flagellum blackish brown; mandible ferruginous; palpi pale stramineous; legs fulvous, the hind tibia infuscate at extreme base and the basal 0.6 of hind coxa brown.

Female: Black. Face near antennal sockets strongly stained with fulvous; antenna medium brown basally, shading to dark brown apically; mandible and palpi light brown; tegula light fulvous; pronotum next to tegula narrowly stained with ferruginous; legs brown, the front pair palest and hind pair darkest brown; hind coxa dark brown, darker than the rest of hind leg.

Type: ♀, Grizzly Mt. at 3,000 ft., Slave Lake, Alta., Aug. 15, 1924, O. Bryant (Washington, USNM 63642).

Paratypes: ♀, Lower Tonsina, Alaska, July 15, 1953, W. C. Frohne (Washington). ♀, Rustler Park at 8,000 to 9,000 ft., Chiricahua Mts., Ariz., July 26, 1927, J. A. Kusche (San Francisco). ♂, Mountain Home, San Bernadino Co., Calif., Sept. 12, 1953, E. I. Schlinger (Davis).

This subspecies occurs in western North America, apparently in the Canadian zone.

19. Stethoncus, new genus

FIGURE 177,a

Front wing 3.5 to 4.2 mm. long; body punctation fine and weak; combined face and clypeus strongly convex transversely, weakly convex vertically, the upper edge of face produced as a broad triangular point which is turned backward between the antennal bases almost at a right angle and separated from rest of face by a strong transverse carina; frons rather strongly convex, without a median process or carina; head in profile sloping obliquely from hind margin of hind ocelli to point usually occupied by occipital carina; temple strongly convex; occipital carina very weak laterally, elsewhere absent; cheek about 1.3 as long as basal width of mandible; mandible broad, with a carina along its lower edge, rectangular with its apex obliquely truncate, its upper tooth wide and short, its lower tooth very wide and very short, its apex oblique; labrum concealed; flagellum filiform, rather short, especially in female; upper margin of pronotum very wide and swollen; propleurum strongly swollen and convex; scutellum convex, rather long, without lateral carina; areolet absent; intercubitus separated from second recurrent by about 0.7 its length; nervulus postfurcal by about 0.5 its length; nervellus strongly inclivous, weakly broken near its lower 0.2; prepectal carina complete, its dorsal end joining front end of subtegular ridge; sternaulus represented by a broad, short, weak impression; metapleurum polished, with a band of small setiferous punctures along its upper margin, elsewhere impunctate and hairless; propodeum moderately long, declivous beyond its apical transverse carina, completely carinated except that median basal area and areola are confluent; propodeal spiracle small, round; legs stout; base of hind coxa weakly produced behind its socket so that it does not form a distinct posterior shoulder; second trochanter of front and middle legs incompletely fused with its femur; spurs of middle tibia rather short, of approximately equal length; tarsal claws apparently simple; abdomen somewhat narrowed basally; first tergite narrow basally, its spiracle near its basal 0.4, its lateral longitudinal carina strong and complete, its median dorsal carinae strong basally, fading out near apical 0.3; second tergite without dorsal carinae; epipleurum of first tergite vestigial, of second tergite very narrow, of third and following tergites wide; seventh tergite not retracted in either sex.

Genotype: *Stethoncus arcticus*, new species.

The generic name is from the Greek "stethos" (breast) plus "onkos" (tumor), referring to the swollen propleurum.

This genus contains the genotype from arctic America, described below, and undescribed species from Germany and the mountains of South India.

Stethoncus arcticus, new species

Figure 177,a

Front wing 3.5 to 4.2 mm. long; flagellum with about 24 segments, the median segments about 1.4 as long as wide in male, about 0.58 as long as wide in female; transverse carina across top of face faintly up-bowed; punctures on mesopleurum small and rather weak, their interspaces about 3.5 times their diameter; metapleurum with band of hairs along its upper margin, the hair band rather wide and irregular in male, very narrow in female; punctures on second abdominal tergite very fine and weak, their interspaces about 3.5 times their diameter.

Black. Flagellum blackish brown; tegula brown; legs brownish fulvous, the middle and hind coxae blackish brown. The legs of the female are darker than in the male, the femora being reddish brown.

An undescribed species from the mountains of South India is very similar to this one but has all coxae fulvous and the transverse carina across the top of the face rather strongly up-bowed.

Type: ♂, Fort Chimo, Labrador, July 22, L. M. Turner (Washington, USNM 63643).

Paratypes: ♀, Mount McKinley at 2,600 ft., Alaska, Aug. 15, 1954, D. Townes (Townes). 4 ♂, same data as type (Washington and Townes). ♂, Nain, Labrador, Aug. 17, 1908, Owen Bryant (Washington). ♂, Ungava Bay, Labrador, July 22, L. M. Turner (Washington). ♂, ♀, Churchill, Man., July 29 and Aug. 1, 1937, W. J. Brown (Ottawa). ♂, Tuckermans Ravine, Mount Washington. N. H., Aug. 24, 1951, H. and D. Townes (Townes).

This is an Arctic species.

20. Synosis, new genus

FIGURE 175,b

Front wing 3.3 to 5.5 mm. long; punctures on body of moderate size; combined face and clypeus more strongly convex transversely than vertically, upper margin of face produced upward a little between the antennal sockets, the point of process truncate or weakly retuse; temple strongly convex; head in profile with an almost vertical, weakly rounded slope from hind margin of hind ocelli to point usually occupied by occipital carina; occipital carina entirely absent; cheek about 1.0 as long as basal width of mandible; mandible of moderate size, tapered apically, its lower tooth smaller than upper tooth; labrum projecting a little beyond margin of clypeus; flagellum of moderate length, filiform; upper margin of pronotum a little thickened, with a faint submarginal groove; propleurum weakly convex; scutellum

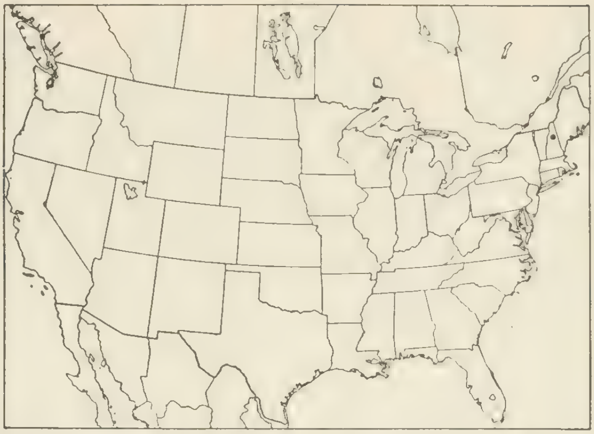


FIGURE 103.—Locality for *Stethoncus arcticus.*

moderately convex, without lateral carina; areolet absent; intercubitus separated from second recurrent by about 1.1 its length; nervulus postfurcal by about 0.55 its length; nervellus strongly inclivous, weakly broken near its lower 0.2; prepectal carina complete, its upper end joining front end of subtegular ridge; sternaulus a weak impression that extends about half the length of mesopleurum; metapleurum polished, with a band of hairs along its upper margin, elsewhere bare; propodeum convex, more strongly declivous behind apical transverse carina, with carinae as in figure 175,b, its median longitudinal carinae approaching closely or fused at base of areola; propodeal spiracle rather small, subcircular; legs moderately stout; hind coxa a little produced posterior to its socket to make a weak, rounded shoulder behind; second trochanter of front and middle legs incompletely fused with its femur; front spur of middle tibia about twice as long as hind spur; tarsal claws apparently simple; abdomen a little narrowed basally; first tergite moderately wide basally, its lateral longitudinal carina strong to the apex, its median longitudinal carinae strong on basal half, absent from apical half; second tergite without dorsal carinae; epipleura of first two tergites vestigial, of third and following tergites wide; female subgenital plate weakly sclerotized, unspecialized.

Genotype: *Synosis clepsydra,* new species.

The generic name is from the Greek "synosis" (a squeezing together), referring to the convergence of the median longitudinal carinae of the propodeum.

There is a single known species, which is described below.

Synosis clepsydra, new species

FIGURE 175,b

Front wing 3.3 to 5.5 mm. long; punctures of mesopleurum fine, their interspaces about 2.0 times their diameter; punctures of second abdominal tergite moderately fine, their interspaces about 1.7 times their diameter.

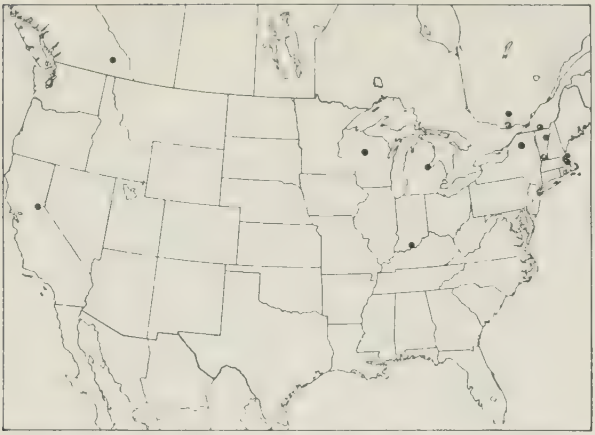


Figure 104.—Localities for *Synosis clepsydra.*

Black. Face, lower corner of frons, rarely narrow frontal orbit, cheek, clypeus, mouth parts, scape and pedicel beneath, tegula, and subtegular ridge, pale yellow; flagellum dark brown, light brown beneath; hind corner of pronotum fulvous and yellow; legs fulvous; first three abdominal tergites often stained with ferruginous apically.

Type: ♀, Camino, Calif., June 27, 1948, H., M., G., and D. Townes (Washington, USNM 63644).

Paratypes: ♀, Kaslo, B. C., 1903, R. P. Currie (Washington). ♂, Crawford Co., Ind., May, C. H. Kennedy (Townes). ♀, Auburndale, Mass., June 17 (Townes). ♀, Forest Hills, Mass., May 21, 1909 (Cambridge). ♂, Midland Co., Mich., June 24, 1951, R. R. Dreisbach (Dreisbach). ♂, ♀, Cranberry Lake, N. Y., June 22, 1924, E. A. Hartley (Washington). ♀, Flatbush, N. Y., June 10, 1890, J. L. Zabriskie (Cambridge). ♀, Kirks Ferry, Que., Aug. 10, 1950, B. P. Beirne (Ottawa). ♀, Knowlton, Que., July 28, 1936, G. S. Walley (Ottawa). ♀, Wright, Que., June 10, 1935, F. A. Urquhart (Ottawa). ♀, Mount Equinox, Bennington Co., Vt., June 5, 1910, C. W. Johnson (Cambridge). ♀, Saint Johnsbury, Vt., June 27, 1906 (Cambridge). ♀, Griffith State Nursery, Wood Co., Wis., July 3, 1949, R. D. Shenefelt (Madison).

This species is transcontinental in the Transition zone. Most adults have been taken in June and July.

21. Genus Exochus

Figures 163,b; 177,b

Exochus Gravenhorst, 1829, Ichneumonologia europaea, vol. 3, p. 328. Type: *Ichneumon gravipes* Gravenhorst; designated by Viereck, 1912.

Amesolytus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 161. Type: *Amesolytus ferrugineus* Ashmead; included by Ashmead, 1896.

Mima Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 206, 219; name preoccupied. Type: *Mima washingtonensis* Davis; monobasic.

Xanthexochus Morley, 1913, Fauna of British India . . , Hymenoptera, vol. 3, p. 292; new synonymy. Type: *Xanthexochus scutellatus* Morley; original designation.

Front wing 2.7 to 7.5 mm. long; body punctation rather fine; combined face and clypeus strongly convex but of various kinds of convexity according to the species; upper margin of face produced as a triangular point between bases of antennae, this triangular point with a median vertical carina behind, which continues between antennal sockets to base of frons; frons without a median process, except in certain Oriental species which have a median compressed ridge on frons; temple flat to strongly convex, usually rather long, so that the head is subcubical; cheek usually about 0.5 as long as basal width of mandible; mandible strongly tapered toward apex, its lower tooth much smaller than upper tooth; areolet absent; intercubitus separated from second recurrent by about 1.2 its length; nervulus sometimes interstitial but usually postfurcal, usually strongly postfurcal; nervellus strongly inclivous, broken near its lower 0.2; prepectal carina complete, its upper end joining front end of subtegular ridge; sternaulus usually absent or indistinct, rarely present as a short sharp impression; metapleurum polished, impunctate, or sometimes with a few scattered punctures; propodeum usually almost or quite completely areolated, the costula frequently absent, the median basal area and areola often confluent, and sometimes other carinae lacking; propodeal spiracle elongate; legs stout or very stout; base of hind coxa not or weakly produced behind its socket so that there is little or no basal shoulder on hind side; second trochanter of front and middle legs almost or quite completely fused with its femur; front spur of middle tibia shorter than hind spur, except in an Australian species, usually very much shorter than hind spur; tarsal claws apparently simple; abdomen parallel-sided or tapered toward base; first tergite at base rather narrow to broad, its spiracle near its basal 0.3, its lateral longitudinal carina strong to apex, its median longitudinal carinae strong basally, but not reaching apex; second tergite without dorsal carinae; epipleura of first two tergites vestigial, of third and following tergites rather wide; seventh tergite not retracted in either sex; female subgenital plate weakly sclerotized, not specialized.

The genus *Exochus* is worldwide in distribution and is the largest genus of the subfamily. It is especially well represented in deciduous woods of the Northern Hemisphere. We have divided the Nearctic species into a number of species groups, to facilitate the comprehension of their characters and relationships and to simplify the problems of specific descriptions. There are additional species groups in other parts of the world. The genus in the broad sense in which we use it contains a rather miscellaneous assemblage of species, but one which it would seem unwise to subdivide into genera or subgenera because of the necessity to recognize about a dozen genera or subgenera for the assemblage if it were subdivided at all, some of which would be very difficult to define with the precision expected for such categories. The less formal divisions of species groups seem more appropriate in this case.

An unusual characteristic of the genus is that many of the species give off a pungent odor when disturbed (as when caught in a net). This odor seems identical with that of *Coccygomimus*, *Ephialtes*, and *Echthromorpha*, and in relation to their smaller size it is just as potent. We have noticed the odor on several species in the field and have field notes of it for the species *russeus*, *albifrons*, *atriceps*, *decoratus*, and *dorsalis*. For some species we failed to make a written record and for others (e. g., *E. tectulum*) we could not detect an odor.

Key to the Nearctic species of Exochus

(*Exochus albiceps* Walsh is not included. It is discussed at the end of the genus, on p. 266.)

1. Epipleurum of third tergite wedge-shaped, the basal 0.75 of the mesal edge straight or slightly concave 2
   Epipleurum of third tergite semicircular or subrectangular, the basal 0.75 of the mesal edge strongly convex 11
2. Frons laterally yellow, the yellow area continuous to top of eye or rarely with a narrow interruption, apical transverse carina of propodeum usually absent or incomplete between the lateral longitudinal carinae; front spur middle tibia about 0.75 as long as hind spur. PICTUS GROUP 3
   Frons laterally black, or if partly yellow or white, this color is not continuous to top of eye; apical transverse carina of propodeum complete; front spur of middle tibia 0.40 to 0.85 as long as hind spur 5
3. Thorax black, the upper margin of pronotum and the subtegular ridge yellow; apical transverse carina of propodeum present medially, at least as vestiges. **4. pictus** Holmgren
   Thorax black in ground color but extensively marked with yellow and ferruginous; apical transverse carina of propodeum entirely absent medially . 4
4. Apical transverse carina of propodeum present mesad of lateral longitudinal carina as a short projecting stub; lower front edge of metapleurum produced ventrad as a lamella that is about 0.55 as deep as long; first lateral area of propodeum usually more or less ferruginous . . . **5. russeus,** new species
   Apical transverse carina of propodeum entirely absent mesad of lateral longitudinal carina; lower front edge of metapleurum produced ventrad as a lamella which is about 0.3 as deep as long; first lateral area of propodeum entirely black . . . . **6. enodis,** new species
5. Nervulus interstitial with basal vein, or distad of basal vein by less than 0.28 of its length; front spur of middle tibia about 0.85 as long as hind spur. GRAVIPES GROUP 6
   Nervulus distad of basal vein by more than 0.30 of its length; front spur of middle tibia 0.45 to 0.60 as long as hind spur. PULLATUS GROUP . . . 9
6. Notaulus an ovoid impression, the long axis of which parallels edge of mesocutum; combined areola and basal area of propodeum 1.5 to 1.7 as long as wide; metapleurum with a few discal hairs. GRAVIPES SUBGROUP. **10. gravipes** (Gravenhorst)

Notaulus a pit which is either circular or somewhat elongate at right angles to edge of mesoscutum; combined areola and basal area of propodeum 1.9 to 2.3 as long as wide; metapleurum with many discal hairs. SEMIRUFUS SUBGROUP 7

7. Abdomen entirely black; second and third segments of hind tarsus pale fulvous, brownish apically . . . . **7. bryanti,** new species

Abdomen partly or almost entirely ferruginous, second and third segments of hind tarsus dark brown 8

8. Coxae fulvous, or rarely black; median flagellar segments of male about 1.15 as long as wide, of female about 1.1 as long as wide. **8. semirufus** Cresson

Coxae black; median flagellar segments of male about 1.0 as long as wide, of female about 0.88 as long as wide . . . . **9. climatus,** new species

9. Notaulus a subcircular pit, from which a short depression leads backwards (the depression strong in male, subobsolete in female); hind femur about 2.3 as long as deep in male, 1.6 to 2.1 as long as deep in female; front wing 3.4 to 5.0 mm. long; hind tibia fulvous, usually somewhat infuscate at base and apex (fig. 192,d) . . . . **13. washingtonensis** (Davis)

Notaulus a short sharp groove, deep anteriorly, quickly fading out posteriorly; hind femur about 2.5 to 2.6 as long as deep; front wing 4.5 to 5.5 mm. long; hind tibia uniformly fulvous 10

10. Coxae and first trochanters fulvous; front spur of hind tibia about 0.84 as long as depth of its tibia; temple shorter, in profile about 0.80 as long as eye in male, about 0.85 as long as eye in female . . . **11. litus,** new species

Coxae and first trochanters blackish; front spur of hind tibia about 0.67 as long as depth of its tibia; temple longer, in profile about 1.4 as long as eye in male, about 1.2 as long as eye in female . . . **12. pullatus,** new species

11. Occipital carina complete dorsally 12

Occipital carina absent dorsally, or if partially present dorsally it is incomplete medially 14

12. Interantennal process of face not unusually prolonged, its point not close to frons; notaulus present as a shallow pit; front wing 3.4 to 4.3 mm. long. STENOSTOMA GROUP . . . . **1. stenostoma,** new species

Interantennal process of face prolonged as an attenuate point that comes close to frons or actually touches frons; notaulus absent; front wing 4.5 to 6.3 mm. long. MITRATUS GROUP 13

13. Apex of interantennal process not touching frons, separated from it by a distinct gap; hind femur fulvous. . . . . **2. mitratus** Gravenhorst

Apex of interantennal process touching and fused with frons; hind femur blackish . . . . **3. turgidus** Holmgren

14. Median half of clypeal margin strongly convex or weakly angled medially (fig. 179,o); mandible of female with a strong subbasal transverse groove, immediately apicad of which the mandible is strongly inflated (fig. 190,u); mandible of male not specialized (fig. 190,r). MANDIBULARIS GROUP . . 15

Median half of clypeal margin truncate or somewhat concave (figs. 179, h–n); mandible of both sexes without a subbasal transverse groove and not inflated 16

15. Second abdominal tergite with about 400 hairs . . **54. decoratus** Holmgren

Second abdominal tergite with about 100 to 150 hairs. **55. mandibularis** Cushman

16. Lateral longitudinal carina of propodeum absent basad of the spiracle, elsewhere weak; median longitudinal carinae of propodeum entirely absent (fig. 188,h). ATRICEPS GROUP . . . . **19. atriceps** Walsh

Lateral longitudinal carina of propodeum complete and strong; median longitudinal carinae of propodeum present (figs. 188,f,g,i,j) 17

17. Median carinae of propodeum subparallel, not bent inward just basad of position of costula but sometimes gradually convergent basally (fig. 188,f); first abdominal tergite slender, 2.7 to 3.1 as long as it is wide at its basal corners. MONTIVAGUS GROUP 18

Median carinae of propodeum bent inward just basad of position of costula (figs. 188,g,i,j); first abdominal tergite stouter, 1.4 to 2.5 as long as it is wide at its basal corners 20

18. Tergites 1 through 6 with a large median apical stramineous triangle; side of frons entirely pale; median carinae of propodeum convergent basally. **16. spinalis,** new species

Tergites 1 through 6 entirely black; side of frons partly or entirely black; median carinae of propodeum subparallel 19

19. Side of frons entirely black; apex of hind femur yellow (fig. 192,e). **14. montivagus,** new species

Side of frons mostly yellow; apex of hind femur fuscoferruginous (fig. 192,f). **15. ochreatus,** new species

20. Pale spots at top of eyes elongate and somewhat convergent posteriorly; second lateral area of propodeum completely covered with hairs (fig. 188,g); second abdominal tergite about 0.75 as long as wide, its punctures rather dense and sharp; basal 0.2 of hind tibia yellow, beyond which it is abruptly ferruginous or fuscous (figs. 192,h,i). SIGNIFRONS GROUP 21

Pale spots at top of eyes subcircular or subtriangular; second lateral area of propodeum usually only partly hairy or almost or quite bare (figs. 188,i,j); second abdominal tergite about 0.6 to 1.6 as long as wide; hind tibia basally fuscous, ferruginous, or whitish, but not exactly as described above . . 22

21. Frons without a median high compressed carina, though a little produced centrally; hind femur whitish to blackish, the apex always yellow or whitish (fig. 192,h) . . . . **17. flavifrontalis** Davis

Frons with a median high compressed carina which almost meets the interantennal process of face; hind femur ferruginous, sometimes a little infuscate or yellowish on the apex (fig. 192,i) . . . **18. dentifrons,** new species

22. Sternaulus distinct and rather sharp, extending about 0.3 the length of the mesosternum; punctures on abdominal tergites so fine and weak that they are difficult to see; hind tibia stramineous, fuscous at base and with an indistinct infuscate stripe on front side (fig. 193,a). SULCATUS GROUP. **20. sulcatus,** new species

Sternaulus not distinct; punctures on abdominal tergites of moderate size and moderately conspicuous; hind tibia colored otherwise in the Nearctic species. TIBIALIS GROUP 23

23. Hind femur and tibia entirely blackish . . . . **25. tenebrosus,** new species

Hind femur and tibia largely pale or conspicuously marked with white, yellow, or fulvous 24

24. Hind tibia fulvous, without any whitish area, but the basal and/or apical 0.15± often infuscate 25

Hind tibia whitish basally, subbasally, medially, or almost entirely, the rest blackish, infuscate fulvous, or in *E. albifrons* fulvous with the apex infuscate 28

25. Point of interantennal process of face with a 45° angle; head flattened in front; hind corner of pronotum yellow . . . . . . **53. silus,** new species

Point of interantennal process of face with a 60° to 100° angle; head not flattened in front; hind corner of pronotum usually black 26

26. Apical margin of clypeus weakly concave; temple swollen, the head as wide across midlength of temple as across eyes; coxae black. **22. evetriae** Rohwer

Apical margin of clypeus subtruncate or in general outline weakly convex; temple not swollen, the head much narrower across midlength of temples than across eyes; coxae fulvous, rarely black in *E. nigripalpis* . . . 27

27. Central 0.75 of clypeal margin truncate, the lateral 0.12 weakly upturned; hind femur of female 2.05 as long as deep (male unknown); face entirely black . . . . **23. hiulcus,** new species

Central 0.6 of clypeal margin truncate, the lateral 0.20 weakly upturned; hind femur of male about 2.45 as long as deep, of female about 2.35 as long as deep; face black, usually with a dorsal median pale mark. **24. nigripalpis** Thompson

28. Hind tibia whitish for almost entire length of its dorsal edge, the rest of the tibia fulvous or brownish (fig. 194,h); face of female blackish with a dorsolateral yellowish white area (fig. 179,k). (Male unknown.) **36. externus,** new species

Hind tibia variously marked with white, fulvous, or blackish, the markings mostly encircling the tibia, never making a continuous whitish stripe along its dorsal edge; face white, black, or variously marked, but never blackish with a dorsolateral yellowish white area 29

29. Hind tibia whitish medially or submedially, pale brown to black on its basal 0.1 to 0.4, the apex fulvous to blackish (or white in some specimens of *Exochus genualis*) (figs. 194,a–g; 194,i–195,e) 30

Hind tibia whitish basally, the whitish area including the extreme base and extending 0.15 to 0.9 the length of the tibia, the apex of the tibia fulvous to black (figs. 195,f–196,f) 45

30. Front spur of hind tibia about 4.1 as long as wide; median section of posterior transverse carina of mesosternum with a small, weak, blunt projection on each side; face and clypeus of female blackish, the upper margin of face and lower margin of clypeus whitish. . . . . . . **21. annulicrus** Walsh

Front spur of hind tibia 1.8 to 3.8 as long as wide; otherwise not entirely as above 31

31. First to fourth segments of hind tarsus white, distinctly darkened (brown to black) at apex (figs. 193,i; 194,f,g); front spur of hind tibia 2.4 to 3.2 as long as wide 32

First to fourth segments of hind tarsus whitish, not at all or only faintly darkened (stramineous) at apex; front spur of hind tibia 1.8 to 3.8 as long as wide 34

32. Thorax mostly fulvous beneath and laterally; front wing 5.3 to 6.3 mm. long; combined clypeus and face distinctly flattened ventrally. **28. armillosus,** new species

Thorax black beneath and laterally with restricted pale yellow markings, rarely with restricted fulvous areas; front wing 3.3 to 5.8 mm. long; combined face and clypeus evenly convex 33

33. Hind tibia with approximately its basal 0.20 and apical 0.40 blackish (fig. 194,f); clypeus entirely whitish. . . . . **34. peroniae,** new species

Hind tibia with approximately its basal 0.15 and apical 0.63 blackish (fig. 194,g); clypeus white with its apical edge blackish.
35. cnemidotus, new species

34. Front spur of hind tibia 3.0 to 3.8 as long as wide 35
Front spur of hind tibia 1.8 to 2.7 as long as wide 40

35. Hind coxa and femur ivory white; hind tibia white, black at base, sometimes rather narrowly blackish at apex (fig. 194,e) . . **33. genualis,** new species
Hind coxa and femur fulvous, the femur usually fulvous at apex; hind tibia white, blackish at base and broadly blackish at apex (figs. 194,a–d) . 36

36. Frons next to eye white for its entire height; hind ocellus separated from eye by 0.2 to 0.5 its long diameter; median longitudinal carinae of propodeum weak 37
Frons next to eye partly or entirely black; hind ocellus separated from eye by 0.6 to 1.1 its long diameter; median longitudinal carinae of propodeum strong. 38

37. Frons black medially, white laterally; hind ocellus of female separated from eye by about 0.45 its long diameter; ground color of thorax blackish, though fulvous markings are very extensive . . . . **30. virgatifrons,** new species
Frons entirely white except for a median ventral pair of small spots and an area enclosing ocelli; hind ocellus of female separated from eye by about 0.25 its long diameter; ground color of thorax fulvous.
31. ferrugineus (Ashmead)

38. Metapleurum entirely black, or if partly fulvous then the mesoscutum is also fulvous; front wing 3.8 to 4.9 mm. long; punctures on second abdominal tergite small, the sublateral ones separated by about twice their diameter.
32. mesorufus, new species
Metapleurum entirely fulvous, or if only partly fulvous then the mesoscutum is entirely black; front wing 4.9 to 7.5 mm. long; punctures on second abdominal tergite of moderate size, the sublateral ones separated by about 1.3 to 1.7 their diameter. 39

39. Combined face and clypeus about 1.36 as high as wide; clypeus of female as convex as the face. . . . . **27. rutilatus,** new species
Combined face and clypeus about 1.02 as high as wide; clypeus of female somewhat flattened, distinctly less convex than the face.
29. brutus, new species

40. Basal dark area of hind tibia 0.40 to 0.45 as long as apical dark area (as measured on dorsal edge of tibia; figs. 195,a,b); apical angle of interantennal process of face 55° to 75°; hind femur without a whitish area at apex or with a small indistinct whitish area (figs. 195,a,b). 41
Basal dark area of hind tibia 0.50 to 0.75 as long as apical dark area (as measured on dorsal edge of tibia; figs. 194,i; 195,c–e); apical angle of interantennal process of face 85° to 120°; hind femur with a distinct whitish area at apex, except in some specimens of *E. spilotus* 42

41. Female: Upper margin of pronotum pale yellow from hind corner to epomia; face and clypeus pale yellow, the face usually with a large median blackish triangle or sometimes more extensively black, the clypeus always pale yellow; flagellum with 26 to 28 segments. . . . **38. signifer,** new species
Female: upper margin of pronotum pale yellow only at hind corner; face and clypeus black, the upper edge of face with a transverse pale yellow band (fig. 179,n); flagellum with about 21 segments.
39. transversus, new species

42. Hind coxa and femur blackish, the femur yellowish at apex (fig. 194,i); top of head without a yellow spot next to eye; lower edge of face and most of clypeus blackish (fig. 179,l). . . . . **37. capnodes,** new species

Hind coxa and femur fulvous, the femur pale yellow or whitish at apex; top of head with a pale yellow spot next to eye; face and clypeus entirely pale yellowish or white. 43

43. Combined face and clypeus about 1.20 as high as wide in male, about 1.08 as high as wide in female, uniformly convex or with the clypeus weakly bulging, their punctures rather small, somewhat sparser on clypeus; scutellum laterally without white or with a very narrow, an interrupted, or an obscure whitish margin; hind femur about 2.20 as long as wide in male, about 2.11 as long as wide in female (fig. 195,c). **40. postfurcalis,** new species

Combined face and clypeus about 1.03 as high as wide, more or less flattened below, especially in female, the punctures on lower part of face coarse and close, on clypeus abruptly sparser; scutellum laterally with a rather wide white margin, except sometimes in *E. spilotus;* hind femur 1.89 to 2.20 as long as wide in male, about 1.60 to 1.97 as long as wide in female (figs. 195,d,e) 44

44. Thoracic pleura and sterna black, without fulvous markings except at coxal articulations; apical angle of interantennal process of frons about 90°. **41. spilotus,** new species

Thoracic pleura and sterna mostly or entirely fulvous; apical angle of interantennal process of frons about 105° . . . . **42. dorsalis** Cresson

45. Hind tibia whitish on its basal 0.15±, fulvous from thence to near its apical 0.2±, the apical 0.2± fuscous (fig. 193,g). . . . . **26. albifrons** Cresson

Hind tibia white or whitish, its apical 0.2 to 0.4 brown or fuscous (figs. 195,f–i; 196,a–f) 46

46. Median part of frons very strongly raised as a narrowly wedge-shaped area that ends ventrally, between antennal sockets, in a high thin ridge. **48. cuneatus,** new species

Median part of frons weakly or strongly raised as a broadly triangular area that ends ventrally, just above antennal sockets, in a broad point . . 47

47. Apical angle of interantennal process 90° to 120°; median area of frons weakly rasied and weakly differentiated 48

Apical angle of interantennal process 60° to 85°; median area of frons rather strongly raised and differentiated. 52

48. Mandible rectangular in outline, approximately parallel-sided from its base to near base of its lower tooth, then abruptly narrowed (fig. 190,m). **47. quadradens,** new species

Mandible triangular in outline, tapered from its base to near base of its lower tooth (figs. 190,i–l) 49

49. First four segments of hind tarsus white, light brown to blackish at apex; hind femur not infuscate (fig. 195,h); white on upper margin of pronotum extending forward at least to epomia . . . . **45. denotatus,** new species

First four segments of hind tarsus uniformly white, or not distinctly darkened at apex; hind femur more or less infuscate at apex (figs. 195,f,g,i) . . 50

50. Apical third of mandible turned about 25° (in male) or 40° (in female) from plane of its condyles, placing the lower tooth toward the mouth; yellow or whitish on upper edge of pronotum extending forward at least to notaulus. **46. ostentatus** Davis

Apical third of mandible not turned, in same plane as its condyles; yellow or whitish on upper edge of pronotum not or rarely extending forward to notaulus. 51

51. Mandible about 0.60 as long as width of mouth opening, its upper tooth unusually small; second lateral area of propodeum with hairs laterally and apicolaterally . . . . **43. fastigatus,** new species

Mandible about 0.77 as long as width of mouth opening, its upper tooth moderately large; second lateral area of propodeum with hairs only in its apicolateral corner. . . . . **44. canidens,** new species

52. Face in profile much more strongly convex in its lower half than in its upper half, so that it bulges ventrally; head about 0.65 as long as high. **52. ventricosus,** new species

Face in profile equally or less convex in its lower half than in its upper half; head about 0.75 as long as high 53

53. Apical half of mandible not turned, its outer face in same plane as its condyles; second to fourth tergites often stramineous in apicolateral corners. **49. pleuralis** Cresson

Apical half of mandible turned about 60° (in female, male unknown) from plane of its condyles; second to fourth tergites black or margined laterally with stramineous 54

54. Combined face and clypeus about 0.89 as high as wide; apical margin of clypeus faintly concave in its medial 0.5; hind femur fulvous, white above at apex (fig. 196,d) . . . . **50. mesodon,** new species

Combined face and clypeus about 0.77 as high as wide; apical margin of clypeus broadly concave; mandible exceptionally long; hind femur fulvous, faintly infuscate above at apex (fig. 196,e) . . **51. megadon,** new species

I. STENOSTOMA GROUP

Front wing 3.4 to 4.5 mm. long; head rather broad but tapered to a narrow mouth; face rather flat, its interantennal process moderately long but not approaching frons, the point making an angle of about 80 degrees; frons weakly convex, somewhat impressed near antennal sockets; occipital carina dorsally and laterally complete but weak, absent near hypostomal carina; clypeal margin weakly convex, its median half subtruncate; head black, upper edge of face, narrow lower lateral part of frons (sometimes complete to top of eye), and sometimes a spot at top of eye, ivory or pale yellow; notaulus present anteriorly as a shallow pit; metapleurum with a few discal hairs, all or mostly in its posterior half; costula incomplete or complete; median longitudinal carinae and apical transverse carina of propodeum complete; second lateral area of propodeum with hairs over its entire surface, or its mesal part bare; nervulus beyond basal vein by about 0.6 its length; front spur of middle tibia about 0.70 to 0.88 as long as hind spur; second segment of middle tarsus about 1.7 as long as wide; hind tibia whitish on its basal 0.2 ±, the rest fulvous or darker; first tergite about 1.4 as long as its width at the laterobasal corners; second abdominal tergite about 0.7 as long as wide, with rather sharp punctures, the interspaces of which are about 0.5 to 3.0 the diameter;

epipleurum of third tergite moderately wide, its inner edge semicircularly convex.

This group includes *E. stenostoma* from western North America, *E. erythronotus* (Gravenhorst) 1820, from Europe, and an undetermined species from Japan.

1. Exochus stenostoma, new species

Figure 188,a,l; 191,a

Front wing 3.4 to 4.3 mm. long; costula incomplete; second lateral area of propodeum with hairs on its entire surface or with its inner 0.3 or less bare; interspaces of punctures on second abdominal tergite about 0.5 their diameter in male, about 0.7 their diameter in female.

Black. Upper margin of face and a short oblique line laterad of antenna, ivory; mandible black, paler apically; maxilla and labium stramineous to fulvous; tegula fulvous, ivory basally; extreme apex of femora and basal 0.2 of tibiae externally, dirty ivory; middle and hind tarsi of male stramineous, brownish apically and on apex of their basal segment; legs otherwise fulvous, their hind coxa, hind femur, hind tibia, and of female the middle and hind tarsi, usually more or less infuscate.

This is close to the European *E. erythronotus* (Gravenhorst) 1820, but differs somewhat in color and in being more densely punctate.

Type: ♀, Leevining, Calif., June 22, 1948, H., M., G., and D. Townes (Washington, USNM 63645).

Paratypes: ♂, Parker Creek, Sierra Ancha, Ariz., May 4, 1947, H. and M. Townes (Townes). ♂, Nanaimo Biological Station, B. C., June 27, 1920, E. P. Van Duzee (San Francisco). ♂, ♀, Alhambra, Calif., Feb. 5 and 6, 1915, J. D. Neuls (Washington). ♂, Bakersfield, Calif., July 13, 1951, L. W. Isaak (Davis). ♂, in light trap, Benicia, Calif., Sept. 10, 1956, E. Megger (Davis). 2♂, Dardanelle, Calif., July 8, 1948, H., M., G., D., and J. Townes

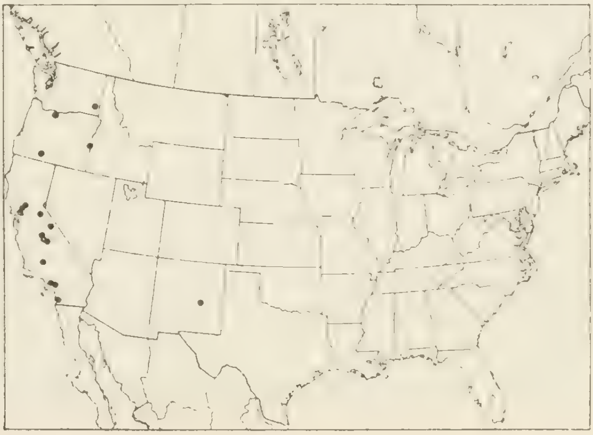


Figure 105.—Localities for *Exochus stenostoma.*

(Townes). ♂, reared from *Ephestia figulilella*, Exeter, Calif., Dec. 23, 1950 (Washington). ♀, Fairfield, Calif., July 6, 1954, E. Megger (Davis). ♂, Glendale, Calif., July 1941, E. I. Schlinger (Townes). ♀, same data as type (Townes). ♂, reared from *E. figulilella*, Lindsay, Calif., Dec. 23, 1951 (Washington). ♂, ♀, reared from larva of *E. figulilella*, Orange Cove, Calif., Jan. 24, 1940, Mr. Kaloostian (Washington). ♂, San Diego, Calif., July 1, 1940 (Townes). ♂, in light trap, Woodland Calif., July 27, 1956, Jack Fowler (Davis). ♀, Algoma, Klamath Falls, Oreg., Sept. 2, 1950, Joe Schuh (Townes). ♂, 5 miles south of The Dalles, Oreg., May 5, 1938, K. Gray and J. Schuh (Corvallis). 4♂, Ontario, Oreg., Aug. 21, 1940, H. and M. Townes (Townes). 3♂, Wawai, Wash., May 20, 1911 (Cambridge).

This species occurs in Washington, Oregon, and California. We have collected it among semidesert shrubbery. It has been reared as a parasite of *Ephestia figulilella*, which feeds on dried fruit.

II. MITRATUS GROUP

Front wing 4.5 to 6.3 mm. long; head rather large; face broad, strongly punctate, in profile evenly and strongly convex or a little flattened centrally, its interantennal process very long, curving backward between the antenna to nearly touch or to fuse with frons, between the process and the frons a thin lamella; frons with a weak bulge just below the ocelli; cheek about 0.5 as long as basal width of mandible; occipital carina strong and complete above, weaker dorsolaterally, and absent below; clypeal margin broadly truncate; mandible rather large but otherwise normal for the genus; head black, the interantennal process, upper lateral corner of face, often entire upper margin of face, and small spot at top of eye whitish; notaulus completely lacking; metapleurum usually with a few discal hairs; costula present or absent; second lateral area of propodeum with rather sparse, evenly scattered hairs; apical transverse carina of propodeum complete; nervulus beyond basal vein by about 0.3 its length; front spur of middle tibia about 0.6 as long as hind spur; second segment of middle tarsus about 1.1 to 1.5 as long as wide in male, about 1.0 to 1.4 as long as wide in female; hind tibia fulvous or blackish, sometimes faintly paler at the base; first tergite 1.6 to 1.9 as long as it is wide at laterobasal corners; second tergite about 0.68 as long as wide, with rather coarse punctures of which the interspaces are about equal to the diameter; epipleurum of third tergite very broad (almost reaching the midline), broadest subapically from which point it narrows somewhat anteriorly, with a broadly rounded anteromesal corner.

This group contains two Holarctic species, as treated below.

2. Exochus mitratus Gravenhorst

FIGURES 188,b; 189,a

Front wing 4.5 to 6.3 mm. long; apex of interantennal process of face not touching frons but separated from it by a distinct gap; second segment of middle tarsus of male about 1.4 as long as wide, of female about 1.35 as long as wide; body punctation a little weaker than in *Exochus turgidus*.

There are two American subspecies, as described below. Three additional subspecies occur in Europe and a fourth in Japan. The European subspecies are *Exochus mitratus mitratus* Gravenhorst 1829, *E. mitratus australis* Thomson 1895 (new status), and *E. mitratus affinis* Holmgren 1856 (new status). Of these three, we have not seen material of the subspecies *australis*, but place it from descriptions. The subspecies *affinis* is very close to the Nearctic *atrocoxalis*, our single specimen of *affinis* differing in having the tegula brown with its front third ivory, rather than pale brown with its front 0.35 and hind corner ivory. The Japanese subspecies seem to be undescribed. We have a single specimen of it, from Tokyo.

The American subspecies of *E. mitratus* are separated by the following key:

1. Upper margin of pronotum entirely white or with a large white triangle next to the tegula; basal 0.2 of hind tibia yellowish, distinctly paler than the rest of the tibia; range: east of long. 100° W. . .**2a. mitratus atrocoxalis** Cresson
   Upper margin of pronotum black, or sometimes with a narrow white line on its extreme posterodorsal corner; basal 0.2 of hind tibia ferruginous like the rest of the tibia or sometimes a little paler; range: west of long. 100° W.
   2b. mitratus orias, new subspecies

2a. Exochus mitratus atrocoxalis Cresson, new status

Exochus atrocoxalis Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 114, ♀.
Lectotype: ♀, Dakota Territory (Philadelphia).

Black. Interantennal process, upper lateral corner of face, usually entire upper margin of face and small spot at top of eye, whitish; upper margin of pronotum partly or entirely yellowish white; subtegular ridge usually narrowly yellowish white; tegula pale yellow, with a pale brown postmedian area, its apex always whitish; apex and side margin of scutellum often whitish; postscutellum often whitish; front femur apically yellowish; narrow apex of middle and hind femora often more or less yellowish, especially in males; coxae black; first trochanters black or blackish; legs fulvous except as described otherwise; wings subhyaline. In a specimen from Wright, Quebec, the coxae and trochanters are entirely fulvous, and in one from Wexford Co., Mich., the hind coxa is largely fulvous. In the rest of our specimens they are black.

The type of *atrocoxalis*, from "Dakota Territory," is intermediate to the western subspecies *orias*. It seems, however, a little closer to the typical eastern subspecies than to the western one.

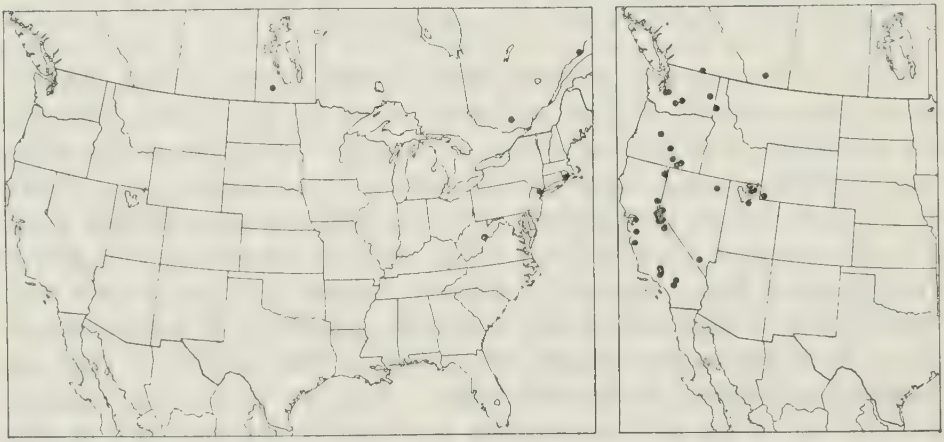
Specimens: ♂, Aweme, Man., June 9, 1935, R. D. Bird (Ottawa). ♀, Wexford Co., Mich., July 20, 1957, R. and K. Dreisbach (Dreisbach). 16♂, 1♀, Tabusintac, N. B., July 21, 1939, J. McDunnough (Ottawa). ♂, Englewood, N. J., June 30, 1938, E. M. Greenspan (Townes). ♂, Kings Co., N. S., June 18, 1931, C. E. Atwood (Ottawa). 11♂, 3♀, Petite Rivière, Que., J. McDunnough (Ottawa). ♂, reared from tortricid on *Kalmia*, Petite Rivière, Que., J. McDunnough (Ottawa). 3♂, 2♀, Godbout, Que., July 25 and 30, 1918, E. M. Walker (Washington). ♀, Wright, Que., June 11, 1935, G. S. Walley (Ottawa). ♂, Westerly, R. I., June 23, 1935, M. Chapman (Townes). ♀ (lectotype), "Dakota" (Philadelphia). 2♀, Texas, G. W. Belfrage (Washington). ♀, Cheat Mt., W. Va., June (Pittsburg).

This subspecies occurs in the Alleghenian fauna. Adults have been collected in June and July.

2b. Exochus mitratus orias, new subspecies

FIGURES 188,b; 189,a; 191,b

Black. Interantennal process, upper lateral corner of face, sometimes entire upper margin of face, and small spot at top of eye, whitish; pronotum entirely black or sometimes a narrow border along the upper hind edge of its hind corner whitish; subtegular ridge sometimes narrowly whitish; front 0.3 and sometimes small hind corner of tegula whitish, the rest brown; side margin of scutellum sometimes whitish; coxae black; first trochanters black or infuscate; legs fulvous except as described otherwise, the basal 0.2 of tibiae sometimes faintly paler; wings subhyaline.



FIGURES 106, 107.—Localities, subspecies of *Exochus mitratus:* 106 (left), *atrocoxalis;* 107 (right), *orias*.

Type: ♂, Dardanelle, Calif., July 3, 1948, H., M., G., D., and J. Townes (Washington, USNM 63646).

Paratypes (33♂, 25♀): From Alberta (Chin); British Columbia (Osoyoos); California (Big Bear Lake in San Bernadino Co., Cedarville, Cuyama Valley in Kern Co., Dardanelle, near Glacier Point in Yosemite National Park, Hope Valley in Alpine Co., Keen Camp, Lancaster, Leevining, Mount Diablo, Palmdale, Pinnacles National Monument in San Benito Co., San Antonio Valley in Santa Clara Co., Snow Flat at 8,700 ft. in Yosemite National Park, and "Tamarack Lake at 7,700 ft."); Colorado; Idaho (Moscow); Nevada (Charleston Mts. at 9,000 ft., Holbrook in Douglas Co., and Pequop Summit Well in Elko Co.); Oregon (Fish Creek at 7,200 ft. in the Steens Mts., Fish Lake at 7,000 ft. in the Steens Mts., Hart Mt., Sunshine Shelter on Three Sisters, and Warner Lake in Lake Co.); Utah (Logan, Newton, Salt Lake, and Wellsville); Washington (Morgans Ferry on the Yakima River, Squaw Creek in the Yakima Valley, Mount Rainier at 5,000 ft., Pressy's in Wenass Valley, Spokane, and Yakima City); and Wyoming (Le Roy).

Adults have been collected from April 1 to August 16. They seem to occur in early summer, and may be found after mid-July only in the higher mountains. Most specimens were collected from late April to early July. Particularly early and late dates of capture are: April 1 at Palmdale, Calif.; April 10 at Mount Diablo, Calif., at Lancaster, Calif., and in Cuyama Valley, Kern Co., Calif.; August 5 at Webber Lake, Sierra Co., Calif.; August 8 at Cedarville, Calif.; and August 16 at Sunshine Shelter, Three Sisters, Oreg.

This subspecies occurs in the western half of the United States and in British Columbia. It is commonest in the Transition and Canadian zones. Adults are on the wing in early summer.

3. Exochus turgidus Holmgren

FIGURE 191,c

Exochus turgidus Holmgren, 1856, Svenska Vetensk. Akad. Handl., ser. 4, vol. 1, p. 312; ♀. Types: ♀♀, central and northern Sweden (?Stockholm).

Front wing 5.5 to 6.3 mm. long; apex of interantennal process of face touching and fused with frons; second segment of middle tarsus of male about 1.15 as long as wide, of female about 1.07 as long as wide; body punctations a little stronger than in *Exochus mitratus*.

Black. Interantennal process, upper lateral corner of face, often entire upper margin of face, small spot at top of eye, and front half of tegula, whitish; back half of tegula brown; front femur and tibia fulvous; extreme apex of middle and hind femur, extreme bases and apices of tibiae, tibial spurs, and small areas on coxae, tinged with brown; wings subhyaline.

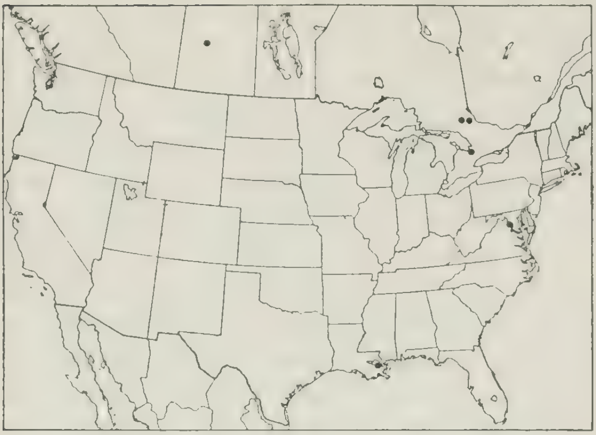


FIGURE 108.—Localities for *Exochus turgidus.*

Specimens: ♀, reared from *Dioryctria auranticella*, Patricks Creek, Calif., June 9, 1916, Miller and Paterson (Washington). 2♀, "Larkins," Fla., S. Graenicher (Washington and Townes). ♂, 2♀, reared from *D. amatella*, New Orleans, La., T. E. Snyder (Washington and Townes). ♂, reared from *D. reniculella*, Camp Borden, Ont., emerged July 13, 1942 (Ottawa). ♂, reared from *D. reniculella*, Hagar, Ont., emerged July 16, 1942 (Ottawa). ♂, reared from *D. reniculella*, Jamot, Ont., emerged July 20, 1942 (Ottawa). ♂, "spruce," emerged July 28 (Ottawa). ♂, reared from *D. reniculella*, Sutherland, Sask., emerged Sept. 6, 1938 (Ottawa), ♂, reared from *Petrova albicapitana*, "Wood Co.," June 10, 1953, Benesh (Washington). ♀, Vienna, Va., Nov. 18, 1913, R. A. Cushman (Washington). ♂, Trittau, near Hamburg, Germany, September 1945, G. Heinrich (Townes).

This species occurs from Ontario to Florida west to California, and also in Europe, but is scarce in collections. It has been reared from *Petrova albicapitana* and from three species of *Dioryctria*.

III. PICTUS GROUP

Front wing 3.5 to 5.2 mm. long; head rather deep, with long sloping temple; face rather narrow, rather strongly convex in profile and more strongly convex transversely, its interantennal process rather broadly triangular, with an apical angle of 90 to 135 degrees; frons weakly swollen centrally; cheek long, about 1.0 as long as basal width of mandible; occipital carina absent above and below, usually present laterally as a fine weak carina (present thus in the three Nearctic species); median half of clypeal margin truncate; head black, extensively marked with pale yellow, the face, broad frontal orbits continuous to (or rarely interrupted) and expanded at top of eye, cheek, more or less of hind orbit and lower part of temple, clypeus, and mouth parts usually pale yellow, or in the female the face largely brownish medially and below; notaulus sharp but short; metapleurum without discal hairs; costula present; second lateral area of propodeum almost bare, with a very few hairs apicolaterally; median longitudinal carinae of propodeum usually obsolescent apicad of basal transverse carina, but sometimes strong; apical transverse carina of propodeum strong between pleural and lateral longitudinal carinae, usually obsolescent or obsolete mesad of lateral longitudinal carinae, but sometimes complete; nervulus distad of basal vein by about 0.3 its length; front spur of middle tibia about 0.75 as long as hind spur; second segment of middle tarsus about 1.5 as long as wide; first tergite 2.1 to 3.8 as long as it is wide at laterobasal corners; second tergite about 0.7 as long as wide, with fine weak punctures of which the interspaces are about 4 times the diameter; epipleurum of third tergite usually narrowly wedge-shaped, widest posteriorly, its inner edge weakly concave (always thus in the three Nearctic species), sometimes the epipleurum broader and with the inner margin rather evenly convex.

This group includes the three Nearctic species treated below (one of which occurs also in Europe) and a large number of species in the cloud forests of the Orient, usually above 5,000 feet elevation. We have seven unidentified species from those areas, and according to their descriptions, *Exochus flavicaput* Morley, 1913, from 6,000 ft. elevation in Sikkim, and *E. flavinotum* Morley, 1913, from 6,400 ft. elevation in Assam, also belong to this species group.

4. Exochus pictus Holmgren

FIGURES 179,g; 188,c; 189,b; 191,d

Front wing 4.2 to 5.2 mm. long; lower front edge of metapleurum produced ventrad as a flange that is about 0.4 as deep as long; costula usually complete and strong; median longitudinal carinae of propodeum present on basal part of areola but fading out apically or continuing faintly to reach the posterior transverse carina; posterior carina of propodeum strong between pleural and lateral longitudinal carinae, present mesad of lateral longitudinal carina, usually as a projecting stub and indicated again as weak mounds at intersections with median longitudinal carinae, elsewhere usually absent or vestigial but in some males complete; first tergite about 1.35 as long as wide in male, about 1.40 as long as wide in female.

There are European and American subspecies, distinguishable on color as in the key below:

1. Yellow on upper margin of pronotum not or rarely extending as far forward as the epomia; hind coxa black or blackish in both sexes; range: Europe. **4a. pictus pictus** Holmgren

Yellow on upper margin of pronotum extending forward to reach the epomia; hind coxa fulvous, sometimes black or blackish in males; range: North America. . . . . **4b. pictus xanthopsis** Ashmead

4a. Exochus pictus pictus Holmgren

Exochus pictus Holmgren, 1856, Svenska Vetensk. Akad. Handl., ser. 4, vol. 1, p. 312; ♂, ♀. Types: ♂, ♀, northern Sweden (? Stockholm).

Male: Black. Face, frontal orbit (to top of eye and expanded there), clypeus, cheek, lower 0.7± of hind orbit, mouth parts, under side of scape, large cuneate mark on upper margin of pronotum which reaches from hind corner to vicinity of notaulus, rarely a vertical mark on prepectus, tegula, often part of scutellum and most of postscutellum, and most or much of legs, lemon yellow; front and middle coxae basally or mostly black; hind coxa black; front trochanter more or less fulvous; middle and hind trochanters blackish to fulvous; femora basally fulvous or fulvous with only the apical part yellow, the hind femur sometimes brownish basally; tibiae, especially the hind tibia, often fulvous; hind tibia often brownish basally and apically; hind tarsus brown. Often there are median fuscous spots on the face, on the clypeal suture, and on the clypeus, and sometimes also a fuscous spot above the clypeal fovea.

Female: Black. Face except above and usually median part of clypeus dark brown; face above, frontal orbit (to top of eye and expanded there), clypeus laterally, cheek, much of hind orbit, mouth parts except palpi, large cuneate mark on upper margin of pronotum (reaching from hind corner to vicinity of notaulus), tegula, sometimes tinge on postscutellum and on apex of scutellum, and front apical part of front and middle coxae, lemon yellow; palpi brown; trochanters brownish; legs beyond trochanters fulvous, the apex of femora in front yellow, and tarsi, especially the hind tarsus, more or less brownish.

Described from seven males and five females from Ireland, Belgium, and Germany.

4b. Exochus pictus xanthopsis Ashmead, new status

Exochus xanthopsis Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 201; ♂. Type: ♂, Victoria, B. C. (Washington).

Male: Black. Frontal orbit (to top of eye and expanded there), clypeus, cheek, lower 0.7± of hind orbit, mouth parts, under side of scape and sometimes of pedicel, broad margin of pronotum (narrowed anteriorly and reaching epomia), sometimes vertical mark on prepectus and rarely adjacent splotch on mesopleurum, tegula, subtegular ridge, usually postscutellum and apical part of scutellum, and much of legs, lemon yellow; front and middle coxae often fulvous basally; hind coxa fulvous to black, most often black in specimens from eastern North America, often fulvous with the posterobasal part fuscous; front and middle femora often partly fulvous; hind femur fulvous, apically yellow.

Female: Black. Face except above and usually median part of clypeus brown; face above, frontal orbit (to top of eye and expanded there), clypeus laterally, cheek, part of hind orbit, mouth parts except palpi, broad upper margin of pronotum (narrowed anteriorly and reaching epomia), tegula, mark on subtegular ridge, sometimes tinge on postscutellum and apex of scutellum, apex of front and middle coxae, and tinge on front apex of front and middle femora, lemon yellow; legs fulvous except where described as yellow.

Specimens (48♂, 27♀): From British Columbia (Cultus Lake, Keremeos, Robson, Steelhead, Vernon, and Victoria); California (Camino, Fish Camp, Humboldt Co., Inverness, San Francisco, and 3 miles west of San Mateo); Colorado ("Pingree Park"); Maine (Bar Harbor, Eagle Lake, and Lincoln Co.); New Hampshire (Mount Madison, Mount Washington at 5,000 ft., and Pinkham Notch); New York (swamp near Oneonta at 1,900 ft., Onteora Mt. in Greene Co., and Wilmington); North Carolina (Clingman's Dome at 6,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Hamrick, Mount Mitchell at 6,400 ft., and Mount Pisgah at 5,300 ft.); Nova Scotia (Baddeck); Ontario (Ottawa and Sudbury); Oregon (Cannon Beach and McMinnville); Quebec (Gracefield, Otter Lake, St. Jean River on the Gaspé, and Stoneham); Tennessee (Great Smoky Mts. at 6,000 ft. and Roan Mt. in Carter Co. at 6,300 ft.); and Washington (Ashford, Glacier, Monroe, and Nooksack River on Mount Baker).

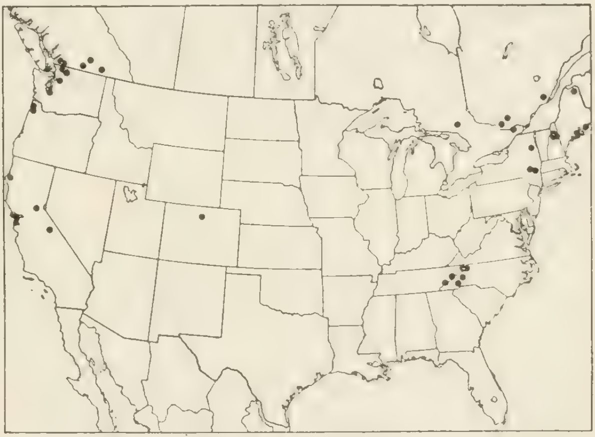


FIGURE 109.—Localities for *Exochus pictus xanthopsis*.

Judging from the collecting dates, adults are common from mid-spring to early fall, with a peak of abundance in August. Especially early and late dates of capture are: March 30 at San Francisco, Calif.; May 10 in Humboldt Co., Calif.; May 20 at Monroe, Wash.; September 2 on Mount Pisgah, N. C.; September 27 near San Mateo, Calif.; and October 22 at Cultus Lake, B. C. The earliest seasonal record for eastern North America is June 12 at Ottawa, Ont. One specimen is labeled as reared from *Heterarthrus nemoratus* at Bar Harbor, Maine, July 5 to 20, 1937.

Judging from our own collecting experience and from the data on other collectors' specimens, the species is common in cool moist woods, such as occur on the higher mountains, and is practically absent from drier situations.

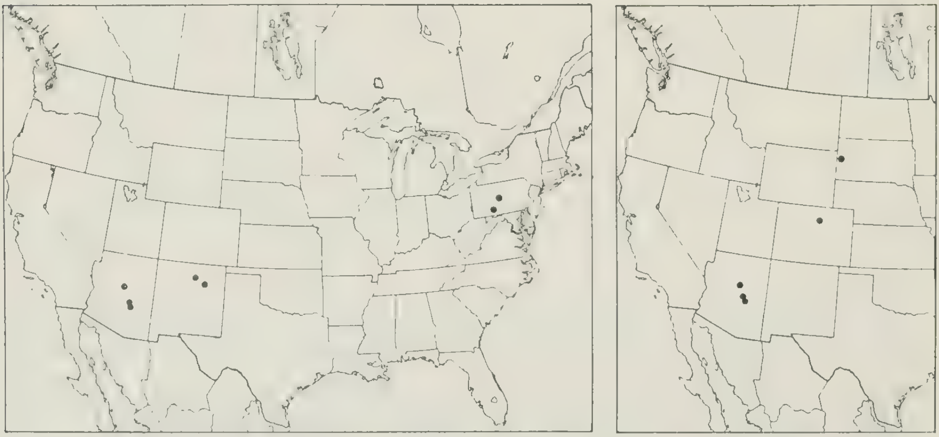
This subspecies is transcontinental in the Canadian and Transition zones. It occurs in cool moist woods, the adults flying from late spring to early fall.

5. Exochus russeus, new species

Figures 188,d; 191,e

Front wing 3.7 to 5.0 mm. long; lower edge of metapleurum produced ventrad as a lamella about 0.55 as deep as long; costula complete; median longitudinal carinae of propodeum obsolescent apicad of basal transverse carina, not reaching position of apical transverse carina; apical transverse carina strong between pleural and lateral longitudinal carinae, present mesad of lateral longitudinal carina as a short stub, absent elsewhere; first abdominal tergite about 1.30 as long as wide in male, about 1.22 as long as wide in female.

Head black, the face, frontal orbit (extending to and expanded at top of eye), cheek, lower 0.75± of hind orbit, clypeus, and mouth parts, ivory; antenna black, the scape and pedicel brownish below; prothorax black, the upper edge of pronotum broadly ivory; mesothorax, metathorax, and propodeum ferruginous; most of prepectus and sutures, especially around scutellum, postscutellum, and wing bases, black; vertical spot on prepectus, subtegular ridge, postscutel-



Figures 110, 111.—Localities: 110 (left), *Exochus russeus;* 111 (right), *E. enodis.*

lum, and side and apex of scutellum ivory; tegula ivory; coxae ivory, the hind coxa anteroventrally and posteriorly brownish; trochanters ivory; femora fulvous, ivory dorsally and apically; front and middle tibiae fulvous, ivory above; hind tibia ivory above and basally, the rest brownish, with a darker brown subbasal spot on front and back sides; tarsi ivory, the hind tarsus brownish apically. Abdomen ferruginous, fuscous on base of first tergite and usually on seventh and following tergites.

Type: ♀, Workman Creek, Sierra Ancha, Ariz., May 8, 1947, H. and M. Townes (Washington, USNM 63647). This specimen was noted to have a strong odor like *Coccygomimus* when it was caught.

Paratypes: ♂, Oak Creek Canyon, Ariz., May 13, 1947, H. and M. Townes (Townes). 4♂, Parker Creek, Sierra Ancha, Ariz., Apr. 19 to May 7, 1947, H. and M. Townes (Townes). ♀, "Beulah, N. Mex.," Aug. 8, 1900, T. D. A. and W. F. Cockerell (Washington). ♂, Las Vegas, N. Mex., August 18, H. S. Barber (Washington). ♀, Laurelton, Pa., August 4, N. Banks (Cambridge). ♀, near Webster Mills, Pa., Aug. 5, 1941, N. Banks (Townes).

This species is recorded from Arizona, New Mexico, and Pennsylvania. It appears to be a species of the Southwest, and its actual occurrence in Pennsylvania needs confirmation.

6. Exochus enodis, new species

FIGURES 188,e; 191,f

Front wing 3.8 to 4.8 mm. long; lower edge of metapleurum produced ventrad as a lamella that is about 0.3 as long as deep; costula complete; median longitudinal carinae of propodeum obsolescent apicad of basal transverse carina, not reaching position of apical transverse carina; apical transverse carina strong between pleural carina and lateral longitudinal carina, elsewhere completely absent; first abdominal tergite about 1.6 as long as wide in male, about 1.4 as long as wide in female.

Male: Head black, the face, frontal orbit (extending to and expanded at top of eye), cheek, lower 0.6 of temple and a spur extending more dorsad along hind orbit, clypeus, and mouth parts, ivory; scape ivory, black above and anterolaterally; pedicel black, ivory below; flagellum black; prothorax ivory, black in the scrobe and neck region; mesothorax, metathorax, and propodeum ferruginous, black along most of the sutures, especially around scutellum, postscutellum, and wing bases, ivory in subtegular area, prepectus except for sternal part of front edge, most of mesopleurum except for black area below subtegular ridge, and with ferruginous areas along sternaulus and posterodorsally, usually a pair of discal longitudinal marks on mesoscutum, scutellum except mediobasally, and postscutellum; tegula ivory; propodeum black, usually more or less ferruginous in pleural areas and medially; legs ivory, the hind coxa fulvous or pale brown posterobasally and anterobasally, and the hind tibia with a fuscous front and back stripe extending from a subbasal spot to the apex; abdomen blackish.

Female: Color like that of the female of *Exochus russeus*, except that first lateral area of propodeum and basal 0.3 of combined basal area and areola are black, and that the abdomen is brown with the apical part of the tergites rufescent, more broadly so laterally and on the median tergites.

Type: ♂, Oak Creek Canyon, Ariz., May 20, 1947, H. and M. Townes (Washington, USNM 63648).

Paratypes: 9♂, Oak Creek Canyon, Ariz., May 17 to 20, 1947, H. and M. Townes (Townes). 5♂, Parker Creek, Sierra Ancha, Ariz., Apr. 20 to May 4, 1947, H. and M. Townes (Townes). 5♂, Workman Creek, Sierra Ancha, Ariz., May 3 and 6, 1947, H. and M. Townes (Townes). 2♀, campus of University of Colorado, Boulder, Colo., T. D. A. Cockerell (Washington). ♂, ♀, Spearfish, S. Dak., July 25 and 26, 1924 (Washington and Townes).

This species has been taken in South Dakota, Colorado, and Arizona. In Arizona we found it in mid-spring, among the herbage of moist stream bottoms at altitudes of about 5,000 to 6,000 ft.

IV. GRAVIPES GROUP

Front wing 4.2 to 6.5 mm. long; head rather narrow, with long sloping temple; face rather narrow, very strongly convex transversely, rather strongly and evenly convex in profile, its interantennal process triangular with an apical angle of about 60 degrees; frons below ocelli with a broadly triangular weakly raised area, of which the median ventral angle is rather prominent; cheek rather long, about 0.6 as long as basal width of mandible; base of mandible unusually broad but beyond the base soon tapered to normal width; occipital carina absent or present laterally as a very fine carina; clypeal margin weakly convex or medially straight; head black, usually with interantennal process and small spot at top of eye pale, sometimes with face and clypeus largely or entirely pale yellow; notaulus present as a sharp pit or a somewhat impressed ovoid area next to mesoscutal margin; metapleurum with none to very many discal hairs; costula present; second lateral area of propodeum usually with hairs only in its apicolateral part, but sometimes with hairs everywhere except basomesally; apical transverse carina of propodeum complete; nervulus opposite basal vein or beyond it by not more than 0.28 of its length; front spur of middle tibia about 0.85 as long as hind spur; second segment of middle tarsus about 1.7 as long as wide; first tergite 2.2 to 2.5 as long as it is wide at laterobasal corners; second tergite about 0.65 to 0.85 as long as wide, with small punctures of which the interspaces are about 3.5 the diameter; epipleurum of third tergite narrowly wedge-shaped, broadest posteriorly, its inner edge straight or slightly concave.

This group includes seven species, one Holarctic, three Nearctic, and three Palaearctic. It is divisible into two subgroups as described below.

SEMIRUFUS SUBGROUP

Notaulus a pit next to mesoscutal margin, the pit either circular or slightly prolonged at right angles to mesoscutal margin; propodeum rather elongate, its combined basal area and areola 1.9 to 2.3 as long as wide.

This subgroup includes the three Nearctic species listed below and the European *Exochus albicinctus* Holmgren, 1873.

7. Exochus bryanti, new species

FIGURE 191,g

Front wing 3.7 to 4.3 mm. long; flagellum with about 33 segments, the median segments about 1.25 as long as wide in male, about 0.80 as long as wide in female; metapleurum with usually a few discal hairs just in front of and below its center, sometimes with more hairs and often with none; second lateral area of propodeum with hairs in its apicolateral 0.5; nervulus sometimes interstitial with basal vein, but often distinctly distad of basal vein, to a distance up to 0.28 of its length (nervulus exactly interstitial or very briefly distad of basal vein in other members of the *gravipes* group).

Black. Small spot at top of eye, maxilla, labium, and tegula, brown; coxae and first trochanters blackish; legs beyond first trochanters fulvous, the tibial spurs and tarsi a little paler, hind tibia a little infuscate at apex, apex of first three segments of hind tarsus light

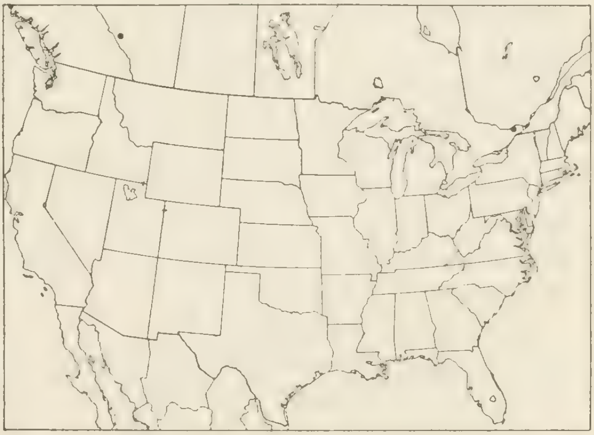


FIGURE 112.—Localities for *Exochus bryanti.*

brown, and last two segments of hind tarsus light brown with their base paler. The interantennal process may be light brownish to blackish. Sometimes the coxae and trochanters are fulvous or fulvous brown rather than blackish.

Type: ♂, Mer Bleue (near Ottawa), Ont., Aug. 9, 1932, G. S. Walley (Ottawa).

Paratypes: 2♂, Vermilion Lake, Banff, at 4,500 ft., Alta., Aug. 17 and 20, 1925, Owen Bryant (Washington). ♂, Baddeck, N. S., July 24, 1936, J. McDunnough (Ottawa). 12♂, 7♀, Mer Bleue (near Ottawa), Ont., June 8, 1933, and Aug. 9, 1932, G. S. Walley (Ottawa).

This species appears to be transcontinental in the Canadian zone.

8. Exochus semirufus Cresson

Figure 191,h

Exochus semirufus Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 114; ♂, ♀. Lectotype: ♀, New York (Philadelphia).

Exochus inflatifrons Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitent des hyménoptères, p. 107; ♀. Type: ♀, Ottawa, Ont. (Quebec).

Exochus rufigaster Ashmead, 1890, Proc. U. S. Nat. Mus., vol. 12, p. 443; ♀. Type: ♀, Texas (Washington).

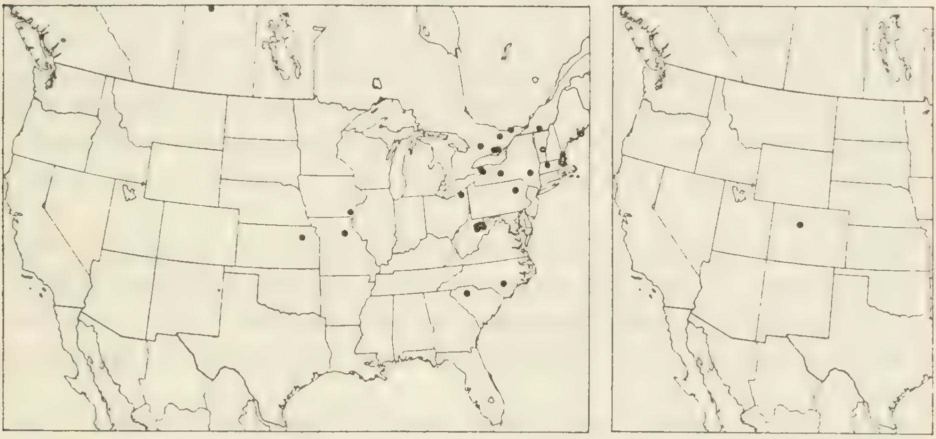
Exochus solitarius Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 216; ♂. Type: ♂, Canada (Philadelphia); the "type" is a composite specimen, with the abdomen of the present species and the rest of the specimen of some other species.

Front wing 4.2 to 6.5 mm. long; flagellum with about 37 segments, the median segments of male flagellum about 1.15 as long as wide, of female flagellum about 1.1 as long as wide; metapleurum with scattered hairs covering about 80 per cent of its surface in the male, covering about 65 per cent of its surface in the female; second lateral area of propodeum with hairs in its apicolateral 0.35.

Black. Interantennal process, usually a small spot at top of eye, maxilla, and labium, stramineous to medium brown; mandible of male yellowish fulvous, black basally; tegula fulvous, yellow on basal 0.35; legs fulvous, the tarsi, especially the hind tarsus, more or less infuscate with basal part of the basitarsi paler; abdomen fulvoferruginous, usually blackish at base and apex. One specimen at hand (♂, Greys Mills, N. B., Sept. 8, 1922, R. P. Gorham (Ottawa)) has the coxae and first trochanters blackish rather than fulvous. Otherwise it seems typical of the present species. Another specimen with the same collection data and of the same sex is normally colored, with the coxae and trochanters fulvous.

Specimens (67♂, 25♀): From Iowa (Mount Pleasant); Kansas (Riley Co.); Maine (Little Deer Island); Maryland; Massachusetts (Amherst, "Clayton," Dorchester, Tyngsboro, and Wellesly); Missouri (Columbia); New Brunswick (Grey's Mills and Waweig); New

Hampshire (Hampton); New York (Buffalo, Grand Island, Greene Co., and Ithaca); North Carolina (Fayetteville); Nova Scotia (Annapolis Royal, Kings Co., Truro, and White Point Beach in Queens Co.); Ohio (Chardon); Ontario (Almonte, Belleville, Blackburn, Bobcaygeon, and Ottawa); Quebec (Knowlton); Pennsylvania (Spring Brook); Saskatchewan (Waskesiu Lake); South Carolina (Greenville); Texas; Vermont (Woodstock); and West Virginia (French Creek, Jackson's Mill in Lewis Co., Philippi, and Shaver's Fork in Tucker Co.).



FIGURES 113, 114.—Localities: 113 (left), *Exochus semirufus;* 114 (right), *E. elimatus.*

The dates of capture group in such a way as to indicate two generations a season, the first emerging in mid-spring and lasting into early summer, the second emerging in late summer and lasting into early fall. Early and late dates of capture for the first generation are: May 10 at Amherst, Mass.; May 11 at Buffalo, N. Y.; May 13 at Spring Brook, Pa.; June 20 at Knowlton, Que.; June 27 at Waweig, N. B.; and June 23 at Annapolis Royal and in Kings Co., N. S. Early and late dates for the second generation are: September 1 at Ithaca, N. Y.; September 2 at Little Deer Island, Me.; September 8 at Truro, N. S.; September 16 at Columbia, Mo.; September 22 at Chardon, Ohio; October 1 to 7 at Shaver's Fork in Tucker County, W. Va.; and October 11 at Greenville, S. C. There are a few dates of capture between these two generations: "July" in Greene County, N. Y.; July 31 at Waskesiu, Sask.; and August 20 at Woodstock, Vt.

We have found the species in overgrown weedy meadows, in rather dry situations. On October 2, 1941, males in some numbers were found flying around the tops of weeds in dry open places, at Greenville, S. C., in the manner characteristic of *Exochus* males.

This species occurs in the Alleghenian and Carolinian faunas, in weedy, rather dry situations. There is an early and a late season generation.

9. Exochus elimatus, new species

FIGURE 191,i

Front wing 4.7 to 5.3 mm. long; flagellum with about 38 segments, the median segments of the male flagellum about 1.0 as long as wide, of female flagellum about 0.88 as long as wide; metapleurum with scattered hairs covering about 75 percent of its surface in male, covering about 40 percent of its surface in female; second lateral area of propodeum with hairs in its apicolateral 0.35±.

Black. Interantennal process, small spot at top of eye, sometimes apical 0.5 of mandible, maxilla, and labium, brown; tegula light brown, yellow basolaterally; legs beyond first trochanters ferruginous, the tarsi, especially the hind tarsus, more or less infuscate, with basal part of the basitarsi paler; abdomen ferruginous, black apically and basally, sometimes mostly blackish with only the median tergites partly ferruginous.

This species is very close to the eastern species *E. semirufus*, from which it differs in the more extensive black coloration, shorter flagellar segments, more polished appearance with shorter body hairs, and somewhat smaller size. It may prove to be only a subspecies of *semirufus*.

Type: ♂, Phantom Valley in the Rocky Mountain National Park at 9,400 ft., Colo., Aug. 8, 1948, H., M., D., and J. Townes (Washington, USNM 63649).

Paratypes: 4♂, 3♀, same locality and collectors as type, Aug. 8, 9, and 12, 1948 (Townes).

GRAVIPES SUBGROUP

Notaulus an ovoid impression next to margin of mesoscutum, the long axis of the impression paralleling mesoscutal margin; metapleurum with few discal hairs which usually cover less than a third of its surface; propodeum not particularly elongate, its combined basal area and areola 1.5 to 1.7 as long as wide.

This subgroup includes the Holarctic *Exochus gravipes* (Gravenhorst) 1820, and the European *E. gravis* Gravenhorst 1829, and *E. incidens* Thomson 1895. All three are structurally very similar to each other, and they may not be distinct species.

10. Exochus gravipes (Gravenhorst)

FIGURES 177,b; 189,c; 192,a

Ichneumon gravipes Gravenhorst, 1820, Mem. Accad. Sci. Torino, vol. 24, p. 384; ♂, ♀. Lectotype (hereby selected): ♀, no data but presumably from Germany, labeled lectotype (Wroclau).

Front wing 4.6 to 6.3 mm. long.

Black. Interantennal process and small spot at top of eye yellowish; maxilla and labium medium brown to blackish; tegula light to dark brown, yellow at base; first trochanters blackish, often tinged with fulvous; legs beyond first trochanters fulvous, the tibiae basally and the tarsi a little paler; apex of hind tibia a little infuscate; apex of first three segments of hind tarsus light brown; fourth and fifth segments of hind tarsus light brown, a little paler basally.

American specimens differ on the average from European specimens in having the markings on the hind tibia and tarsi a little more contrasting and in having fewer (4 to 12) discal hairs on the metapleurum.

Specimens: ♀, Cheboygan Co., Mich., Aug. 4, 1938, Eugene Kenaga (Washington). ♂, Baddeck, N. S., July 21, 1936, T. N. Freeman (Townes). ♀, Baddeck, N. S., July 29, 1936, J. McDunnough (Townes). ♂, Sudbury, Ont., 1888 (Ottawa). 4♂, from Germany and Belgium (Townes).

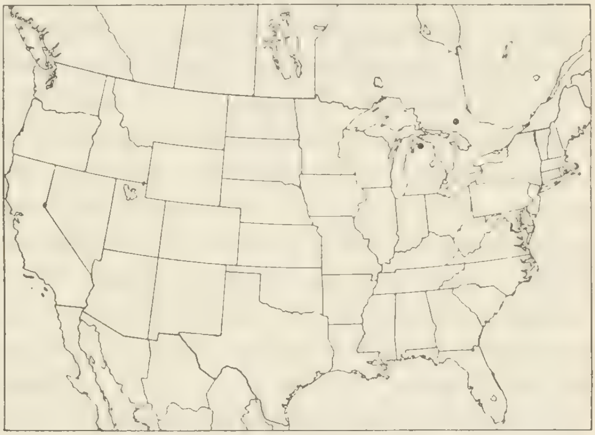


Figure 115.—Localities for *Exochus gravipes*.

This species is known in America from four specimens from Nova Scotia, Ontario, and Michigan. It is common and widely distributed in Europe.

V. PULLATUS GROUP

Front wing 3.4 to 5.8 mm. long; head rather deep, its temple of moderate length; face moderately narrow and moderately convex, or in some females rather strongly protuberant above; interantennal process moderate, its point approximately a right angle; frons somewhat swollen centrally, a little impressed above each antennal socket; cheek about 0.85 to 1.2 as long as basal width of mandible; occipital carina entirely absent or present laterally as a fine weak carina; median half of clypeal margin truncate; head black, a spot at top of eye, often more or less of lower part of lateral margin of frons, and more or less of face, clypeus, and lower part of temple whitish or yellow; notaulus a short strong groove or sometimes reduced to a subcircular pit on margin of mesoscutum; metapleurum sometimes with a few discal hairs; costula present; median longitudinal carina and apical transverse carina of propodeum complete; second lateral area of propodeum with hairs along its lateral edge and apicolaterally, or sometimes with hairs over most of its surface except the mesobasal corner; nervulus distad of basal vein by about 0.4 to 0.6 its length; front spur of middle tibia about 0.45 to 0.60 as long as hind spur; second segment of middle tarsus about 1.3 as long as wide; first tergite 1.7 to 2.3 as long as it is wide at laterobasal corners; second tergite about 0.7 as long as wide, with moderate-sized, rather sharp punctures the interspaces of which are about 1.0 to 4.0 the diameter; epipleurum of third tergite wedge-shaped, broadest posteriorly, its inner edge straight or weakly concave.

This group includes the three Nearctic species described below, five unidentified Neotropic species, two unidentified species from Japan and China, one unidentified species from Java, the European *Exochus flavomarginalis* Holmgren, 1854, a Palaearctic species that is commonly determined as *E. prosopius* Gravenhorst, 1829, and possibly the Madagascan *E. passaventi* Seyrig, 1934. *E. passaventi* has the interantennal process attenuate and the inner margin of the epipleurum of the third tergite definitely concave, and is thus atypical for the group. The species *E. washingtonensis* and *E. flavomarginalis* form a subgroup with a short, rather pitlike notaulus, stouter, more depressed build, and colorational divergences which indicate that they are rather unrelated to the species close to "*E. prosopius*," and that they are possibly closer to the Nearctic *E. annulicrus* and the European *E. semilividus* Vollenhoven, 1875. These latter two, however, are placed in the *tibialis* group because of the convex inner margin of the epipleurum of the third tergite.

11. Exochus litus, new species

FIGURES 179,h; 192,b

Front wing 4.5 to 5.5 mm. long; body moderately slender; face rather narrow, moderately protuberant, its punctures moderately coarse, their interspaces about 0.7 their diameter; temple in profile about 0.77 as long as eye in male, about 0.85 as long as eye in female; notaulus a short sharp groove, deep anteriorly; front spur of middle tibia about 0.55 as long as hind spur; front spur of hind tibia about 0.84 as long as depth of its tibia; hind femur about 2.55 as long as deep; second lateral area of propodeum with hairs laterally and apicolaterally.

Black. Face of male, upper margin of face of female, small triangle at top of eye, marks on cheek in male, clypeus of male, mandible, glossa, small hind corner of pronotum, subtegular ridge, and vertical elliptical area on prepectus of male, pale yellow. Usually the male face has a median vertical blackish mark, and the male clypeus has a median apical transverse blackish mark. Sometimes the female face and clypeus are marked with pale yellow in addition to the constant broad border on upper margin of face. Antenna brownish beneath; palpi brown; tegula brown, its base pale yellow; legs uniformly fulvous, except that the hind tarsus is brownish apically and that in the male the front and middle coxae and the front trochanters are more or less tinged with pale yellow.

This species is structurally similar to a Palaearctic species commonly (but incorrectly) determined as *Exochus prosopius* Gravenhorst, 1829. It may prove to be a subspecies of it.

Type: ♀, Dardanelle, Calif., July 8, 1948, H., M., G., D., and J. Townes (Washington, USNM 63650).

Paratypes: ♂, Nazan Bay, Atka, Aleutian Islands, Alaska, July 28, 1907, E. C. Van Dyke (Ithaca). 2♂, 1♀, swept from parsley field, Arcadia, Calif., Nov. 5, 1945, Elmore Jaynes (Washington). ♂, Berkeley, Calif., Apr. 13, 1915, E. P. Van Duzee (Washington). ♂, Berkeley, Calif., "12–9–34" (Townes). ♀, Berkeley, Calif., October 2, J. C. Bradley (Ithaca). ♂, Camino, Calif., June 30, 1948, H., M., G., and D. Townes (Townes). 15♂, 4♀, Dardanelle, Calif., July 2 to 8, 1948, H., M., G., D., and J. Townes (Townes). ♀, Los Gatos, Calif., Feb. 29, 1936, C. A. Hamsher (Davis). ♀, Stinson Beach, Calif., Feb. 22, 1926 (Berkeley). ♀, "Spooner Pass," Nev., July 12, 1948, C. A. Downing (Davis). ♀, Truro, N. S., Aug. 26, 1913, R. Matheson (Ithaca). ♂, Cannon Beach, Oreg., Aug. 11, 1940, H. and M. Townes (Townes). ♀, Summit, Oreg., July 5, 1929, H. A. Scullen (Washington). 2♂, Ashford, Wash., Aug. 19, 1940, H. and M. Townes (Townes). ♂, ♀, Mount Rainier at 4,200 ft. and at 4,700 ft., Wash., July 11 and 15, 1940, H. and M. Townes (Townes).

This species has been taken from Alaska to California, and once in Nova Scotia.

12. Exochus pullatus, new species

FIGURE 192,c

Front wing 4.8 to 5.5 mm. long; body build average for the *pullatus* group; face rather broad and flat, its punctures moderately coarse, their interspaces about 0.5 their diameter; temple in profile about 1.4 as long as eye in male, about 1.2 as long as eye in female; notaulus a short sharp groove, deep anteriorly; front spur of middle tibia about 0.56 as long as hind spur; front spur of hind tibia about 0.67 as long as depth of its tibia; hind femur about 2.50 as long as deep; second lateral area of propodeum hairy on most of its surface, bald basomesally.

Black. Small spot at top of eye yellow or obscure brownish; upper margin of face tinged with brown; tegula dark brown; coxae black, the hind coxa sometimes with a fulvous stripe in front; first trochanters blackish, sometimes tinged with fulvous; second trochanters mostly fulvous; femora and tibiae uniformly fulvous; tarsi brownish, the front tarsus paler.

Type: ♀, Churchill, Man., June 23, 1937, W. J. Brown (Ottawa).

Paratypes: ♀, Mile 149, Richardson Highway, Alaska, July 4, 1951, W. R. M. Mason (Ottawa). ♂, Churchill, Man., July 3, 1937, W. J. Brown (Ottawa).

This appears to be an arctic species.

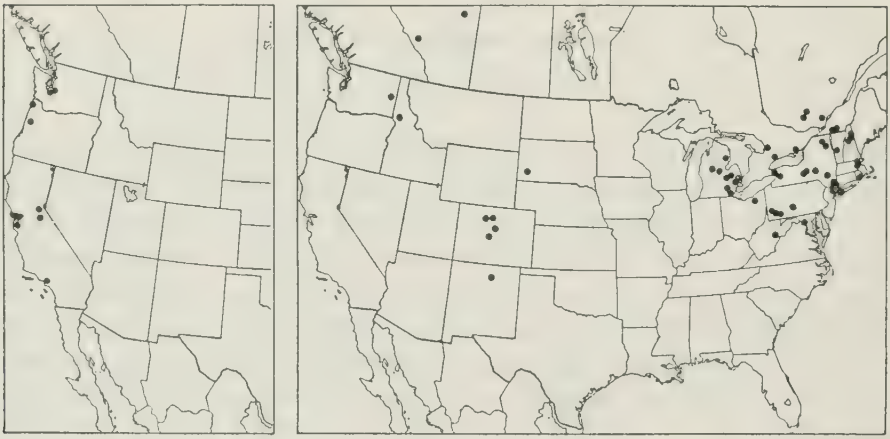
13. Exochus washingtonensis (Davis)

FIGURE 192,d

Mima washingtonensis Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 219; ♀. Lectotype: ♀, Mount Washington, N. H. (Philadelphia).

Front wing 3.4 to 5.0 mm. long; body rather stout and depressed; face unusually narrow and protuberant above, especially in female, its punctures moderately coarse, their interspaces about 0.7 their diameter; temple in profile about 0.8 as long as eye in male, about 0.85 as long as eye in female; notaulus a subcircular pit from which a short impression leads backward (the impression strong in male, subobsolete in female); front spur of middle tibia about 0.48 as long as hind spur; front spur of hind tibia about 0.68 as long as depth of its tibia; hind femur about 2.3 as long as deep in male, 1.6 to 2.1 as long as deep in female; second lateral area of propodeum with hairs along its lateral margin and usually also apicolaterally.

Male: The males vary considerably in the extent of pale markings, and this variation has a cline from the Carolinian to the Transition



FIGURES 116, 117.—Localities: 116 (left), *Exochus litus;* 117 (right), *E. washingtonesis.*

and Canadian faunas, the palest specimens being from the Carolinian and darkest from the Canadian. Below are descriptions of a typical pale male and a typical dark male. Intermediates are abundant.

Pale male: Black. Face, side of frons in its lower half, triangle at top of eye, cheek, lower 1.4 of temple, clypeus, mouth parts, under half of scape and pedicel, lower corner and upper hind half of pronotum, propleurum except above, tegula, subtegular ridge, mesosternum, lower 0.25 and front lower part of mesopleurum, and front and middle legs, yellow, the area of the sternaulus and front and middle femora behind, fulvous; hind legs fulvous, the tarsus and the tibia subbasally tinged with yellow, and the tibia faintly infuscate at base and apex.

Dark male: Black. Face, triangle at top of eye, cheek, temple below, mouth parts, under side of scape, hind corner of pronotum, propleurum next to its coxa, tegula, subtegular ridge, large vertical elliptical spot on prepectus, and front and middle coxae and trochanters, yellow; front and middle legs beyond their trochanters pale fulvous, the femora more ot less yellow; hind coxa blackish, yellow at apex and below; hind trochanters yellowish in front, brownish or blackish behind; hind femur fulvous, infuscate apically, especially above; hind tibia fulvous, infuscate on basal 0.2 and apically; hind tarsus fulvous, its segments apically pale brown.

Female: Upper margin of face, often lower lateral margin of frons and lower margin of clypeus, palpi, and mandible subapically (especially on margins), dirty whitish; antenna dark brown, paler below, its scape sometimes whitish below; tegula whitish or sometimes brown with a basal whitish spot; hind corner of pronotum usually fulvous; subtegular ridge usually pale; legs fulvous or sometimes tinged with brown, the hind tibia infuscate basally and apically.

Females of this species from Canadian localities are often smaller, darker, and with stouter legs and longer heads than normal. Specimens showing these differences strongly are from Pinkham Notch, N. H.; Whiteface Mt., at 1,000 to 2,000 ft., N. Y.; Keene Valley, N. Y.; and Phantom Valley in Rocky Mountain National Park at 9,400 ft., Colo. In these the head is 0.90 to 0.97 as long as deep, while in more typical females the head is about 0.85 as long as deep. Because of intergrading specimens we cannot consider the form with the longer head specifically distinct.

Specimens (106♂, 49♀): From Alaska (Mount McKinley at 2,500 ft.); Alberta (Banff, Beaverlodge, and Edmonton); Colorado (5 miles west of Cameron Pass in Larima County, Pando, Phantom Valley in Rocky Mountain National Park at 9,400 ft., and Rabbit Ears Pass at 9,500 ft.); Idaho ("Craig Mts." and Waha); Maine (South West

Harbor); Maryland (Glen Echo); Massachusetts (Auburndale, Holliston, and Lexington); Michigan (Ann Arbor, Clare Co., Genesee Co., Iosco Co., Lapeer Co., Macomb Co., Midland Co., Monroe Co., and St. Clair Co.); New Hampshire (Gorham, Mount Washington, and Pinkham Notch); New Jersey (Ramsey); New Mexico (Jemez Springs); New York (Lake Sebago in Bear Mountain State Park, Big Indian Valley in the Catskill Mts., Boston, Farmingdale, Ithaca, Keene Valley, McLean, New York City, Oneonta, Poughkeepsie, Mount Whiteface at 1,000 to 2,000 ft., and Tuxedo); Ohio (Akron); Ontario (Gananoque, Orillia, Ridgeway, and Toronto); Pennsylvania (Allegheny County, and Powermill Nature Reserve in Westmoreland Co.); Quebec (Brome, Kazubazua, Knowlton, Lac Nominingue in Labelle Co., and St. Esprit); Rhode Island (Hopkington); South Dakota (Mount Rushmore); Vermont (Rutland); Washington (Valleyford); and West Virginia (Cheat Mt. at 2,000 ft.).

Collection dates are rather evenly distributed from late in May to August 25, with one collection in September. Especially early and late seasonal dates are: May 12 at Akron, Ohio; May 17 at Valleyford, Wash.; May 20 at Ann Arbor, Mich. and at Waha, Idaho; May 28 in Monroe Co., Mich., and in Macomb Co., Mich.; June 6 at Brome, Que.; August 21 at St. Esprit, Que.; August 22 in Hinckley County, Ohio; August 23 at Lexington, Mass.; August 23 and 24 at Pinkham Notch, N. H.; August 25 on Mount Whiteface, N. Y., at 1,000 to 2,000 ft.; and September 6 at Banff, Alta.

This species is transcontinental, in the Upper Austral to Hudsonian zones.

VI. MONTIVAGUS GROUP

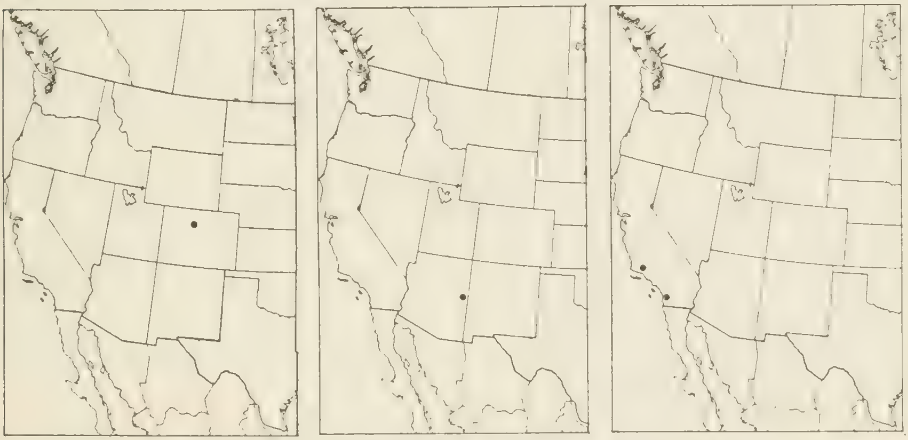
Front wing 3.0 to 4.3 mm. long; head rather high, with moderately narrow temple and moderately long cheek; face moderately narrow and moderately convex, its interantennal process moderately short, the point making an angle of about 85 degrees; frons moderately convex, a little impressed near antennal sockets; occipital carina absent dorsally and below, present laterally as a fine weak carina; median half of clypeal margin truncate; head black, the face, clypeus, and subtriangular spot at top of eye pale yellow, the face and clypeus sometimes partly brownish; frons laterally black, or partly or entirely yellowish; cheek and lower part of temple usually pale yellow; notaulus rather long but weak and not very sharp; metapleurum without discal hairs; costula complete, incomplete or absent; median longitudinal carinae and apical transverse carina of propodeum complete, the median longitudinal carinae subparallel or gradually convergent basally, not bent inward just basad of the position of the costula; second lateral area of propodeum with hairs apicolaterally, laterally, or all over; nervulus beyond basal vein by about 0.5 its length; front spur of middle tibia 0.40 to 0.62 as long as hind spur; second segment of middle tarsus about 1.8 as long as wide; first tergite 2.7 to 3.1 as long as its width at basal corners; second tergite 0.83 to 0.92 as long as wide, with rather fine and weak punctures the interspaces of which are about 0.7 their diameter, the punctures often sparser or absent medially; epipleurum of third tergite moderately wide, subtruncate apically, the inner edge evenly convex.

This group includes the three Nearctic species described below, an undetermined species from the mountains of China, two from the mountains of the Philippines, and two from the mountains of Java.

14. Exochus montivagus, new species

FIGURES 188,f; 189,d; 192,e

Female type: Front wing 4.3 mm. long; costula represented by a weak stub on the lateral longitudinal carina of propodeum; second lateral area of propodeum with hairs on its lateral 0.35, the rest bare; median longitudinal carinae of propodeum subparallel; front spur of middle tibia 0.60 as long as hind spur; punctures on second abdominal tergite almost absent from median 0.2 of the tergite, elsewhere moderately dense.



FIGURES 118–120.—Localities: 118 (left), *Exochus montivagus;* 119 (center), *E. ochreatus;* 120 (right), *E. spinalis.*

Black. Face, large spot at top of eye, cheek and adjacent part of temple, clypeus, mouth parts, hind corner of pronotum, tegula, subtegular ridge, apex of scutellum, postscutellum, front coxa, middle coxa except for fulvous base, trochanters, apical 0.2 of femora and basal 0.2 of tibiae, light yellow; hind coxa blackish brown, its apical 0.25 light yellow; femora and front and middle tibiae and tarsi fulvous except where described as yellow; hind tibia fulvous, pale yellow on its basal 0.2 and infuscate apically and just beyond the basal yellow part; tibial spurs whitish; first two segments of hind tarsus whitish, brown at apex; third to fifth segments of hind tarsus brown, the base of the third segment paler.

Type: ♀, Phantom Valley at 9,400 ft., Rocky Mountain National Park, Colo., Aug. 10, 1948, H., M., D., and J. Townes (Washington, USNM 63651).

15. Exochus ochreatus, new species

Figure 192,f

Male: Front wing 3.3 to 3.8 mm. long; costula absent; second lateral area of propodeum with hairs on its lateral 0.35, the rest bare or with a few scattered hairs; median longitudinal carinae of propodeum subparallel; front spur of middle tibia about 0.46 as long as the hind spur; punctures on second abdominal tergite evenly distributed, moderately dense.

Black. Face, side of frons in its lower 0.7, large spot at top of eye, cheek, lower 0.3± of temple, clypeus, mouth parts, scape except above, large cuneate mark along upper margin of pronotum, tegula, subtegular ridge, sometimes extreme apex of scutellum, usually lower corner of pronotum, lower 0.4 of propleurum, and front and middle legs pale yellow, the front and middle tarsi pale brown apically; hind coxa pale yellow, fulvous basally and blackish above; hind trochanters pale yellow, tinged with fulvous; hind femur light fulvous, brownish above and at apex; hind tibia whitish, infuscate apically, fulvous below and laterally except towards its base, and with a faint fuscous ring at its basal 0.25; hind tibial spurs and hind tarsus pale stramineous, the first three tarsal segments light brown apically and the last two segments entirely light brown.

Type: ♂, near Alpine, Ariz., May 26, 1947, H. and M. Townes (Washington, USNM 63652).

Paratypes: 9♂, near Alpine, Ariz., May 24, 26, and 27, 1947, H. and M. Townes (Townes).

16. Exochus spinalis, new species

Figure 192,g

Male: Unknown.

Female: Front wing 3.4 to 3.6 mm. long; costula absent; second lateral area of propodeum with hairs all over; median longitudinal carinae of propodeum rather weakly convergent basally; front spur of middle tibia 0.42 as long as hind spur; punctures on second abdominal tergite moderately dense, sparser on the median triangular pale area.

Blackish brown. Head and mouth parts pale stramineous except for a broad dark brown longitudinal stripe enclosing ocelli and continuing to between antennal sockets (a little narrowed toward antennal sockets) and a brown area covering most of the hind part of head above, the brown area narrowly connected behind ocelli with the frontal stripe and laterally reaching hind margin of eye near its top; antenna blackish brown, the scape pale brown in front; broad upper margin of pronotum, entire under side of thorax, sides of thorax except for the dorsal 0.3±, tegula, subtegular ridge, scutellum, postscutellum, front and middle legs, and hind coxa, trochanters, and femur, pale stramineous; central 0.3 of mesoscutum stramineous, the rest light brown with a narrow lateral margin of blackish brown; hind tibia pale stramineous, the basal and apical 0.15 and a stripe the length of its front side, infuscate; hind tarsus pale stramineous, the apex of each segment brown; abdominal tergites each with a large, elongate, median, stramineous triangle, the base of the triangle on the apical margin of each tergite; third and following tergites stramineous laterally.

Type: ♀, Vista, Calif., Sept. 5, 1955, D. J. Ott (Washington, USNM 63653).

Paratype: ♀, Oaji, Calif., "3.8.92," H. C. Fall collection (Cambridge).

A third female differs from the type and paratype in having the metapleurum black, lateral third of mesoscutum blackish, and dark markings on hind leg more distinct. It is labeled "Subirana Yoro, Honduras, Stadelman" and is in the Cambridge collection. Possibly it represents a distinct subspecies.

VII. SIGNIFRONS GROUP

Front wing 2.7 to 5.2 mm. long; head rather cubical, the temple long and rather or quite flat and the cheek very short; face strongly convex in profile, its interantennal process rather long and acute, its point making an angle of about 30 degrees; frons protuberant centrally, with a strong oblique impression above each antennal socket, sometimes with a high median lamellate carina; occipital carina absent, or laterally present as a weak vestige; median 0.6 of clypeal margin truncate; head black; more or less of the face, lower lateral part of frons, mandible, and cheek, yellow; spot at top of eye elongate, slanted slightly mesad posteriorly, often separated from margin of eye, the two spots appearing as abbreviated parentheses around the hind ocelli; notaulus moderately strong, very short; metapleurum sometimes with a few discal hairs, these mostly in the posterior half; costula complete, incomplete, or absent; median longitudinal carinae and apical transverse carina of propodeum complete, the median longitudinal carinae strongly bent inward just basad of the position of the costula; second lateral area of propodeum with moderately dense hairs over its entire surface; nervulus beyond basal vein by about 0.2 to 0.6 its length; front spur of middle tibia about 0.3 to 0.5 as long as hind spur; second segment of middle tarsus about 1.3 as long as wide; hind tibia whitish on its basal 0.2±, beyond which it is abruptly fulvous or infuscate; first tergite 1.4 to 1.8 as long as width at basal corners; second tergite about 0.75 as long as wide, its punctures rather coarse and strong, rather evenly distributed except that the apical 0.17± of the tergite is almost impunctate and that sometimes the median part of the tergite is more sparsely punctate; epipleurum of third tergite subtrunctate apically, its inner margin rather evenly convex.

This group contains the two Nearctic species described below and, judging from their descriptions, the European *Exochus frontellus* Holmgren 1858, *E. fletcheri* Bridgman 1884, and *E. signifrons* Thomson 1887. We have an undetermined species from Ireland which may be one of the three named European species.

17. Exochus flavifrontalis Davis

Figures 179,i; 188,g; 189,e; 192,h

Exochus flavifrontalis Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 217; ♂, ♀. Lectotype: ♀, Nevada (Philadelphia).

Exochus alpinus Cushman, 1922, Proc. U. S. Nat. Mus., vol. 61, art. 8, p. 13; ♂ (name preoccupied by Zetterstedt, 1838; new synonymy). Type: ♂, alpine region of Mount Washington, N. H. (Washington).

Front wing 2.7 to 4.2 mm. long; frons swollen medially but without a median carina; nervulus beyond basal vein by about 0.3 its length; second abdominal tergite with rather coarse strong punctures, the interspaces of which are about 0.6 their diameter, the punctures lacking from apical 0.17 of the tergite but otherwise evenly distributed.

Black. Face and clypeus with a variable amount of pale yellow, in

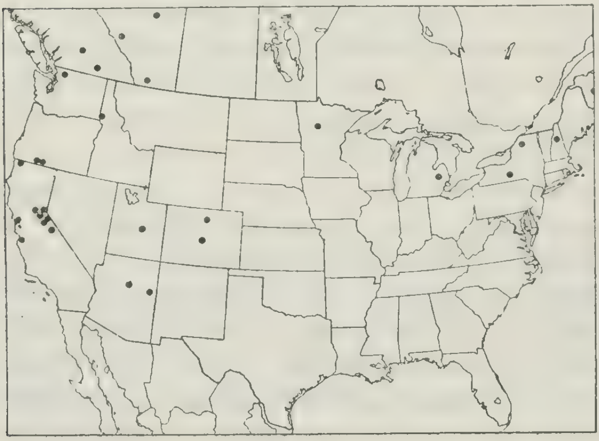


Figure 121.—Localities for *Exochus flavifrontalis*.

the male usually with the upper half of the face yellow and the lower half and clypeus black, the yellow area with a deep median ventral notch that almost divides it into two large lateral quadrate spots. In the female the face and clypeus are usually entirely yellow with a more or less distinct median vertical brown line on face, a brown line between clypeal foveae, and apical margin of clypeus brown. Sometimes these brown lines are more or less enlarged and fused to make most of the face and clypeus blackish. Often in the female and sometimes in the male the face and clypeus are entirely pale yellow. Yellow spot at top of each eye elongate, the two spots weakly convergent posteriorly near the hind ocelli, and usually a little separated from margin of eye; mandible of male usually brown, of female usually yellow; palpi yellowish to brown; hind corner of pronotum sometimes yellow, especially in males from eastern North America; tegula yellow, its apical half fulvous to dark brown; subtegular ridge rarely yellow; color of legs varying from pale stramineous (in some males from eastern North America), to mostly blackish with conspicuous yellow markings, most commonly as follows: coxae black, the front and middle coxae partly yellow apically; front and middle trochanters yellow, brownish basally above; hind trochanters mostly brown; front and middle femora fulvous, the apical 0.15 yellow, the middle femur a little darkened subapically; hind femur blackish brown, paling to fulvous basally, its apical 0.15 yellow; front and middle tibiae fulvous, the basal 0.2 pale yellow; hind tibia brown, its basal 0.2 yellow; tarsi stramineous, tinged with light brown apically.

Specimens (38♂, 19♀): From Alberta (Banff, Edmonton, Lethbridge, and Slave Lake); Arizona (near Alpine and Oak Creek Canyon); British Columbia (Robson and Vernon); California (Auburn, Camino, Dardanelle, Fallen Leaf Lake in Eldorado Co., Leevining, Salinas, San Francisco, Siskiyou Co., and near Sonora Pass at 8,500 ft.); Colorado (Florissant and Lyons); Idaho (Lewiston); Michigan (Lapeer Co.); Minnesota (Itasca State Park); Nevada; New Brunswick (Bartholomew River); New Hampshire (*Carex* meadow on Mount Washington at 5,960 ft.); New York (Cranberry Lake and Ithaca); Northwest Territories (Hay River); Oregon (Aspen Lake and Klamath Falls); Utah (Emory); Washington (Bayview Ridge in Skagit Co.); and Yukon (Dawson).

Adults have been collected from late spring to early September. Early and late seasonal records of note are: April 26 at Lewiston, Idaho; May 17 at Vernon, B. C.; May 23 at Ithaca, N. Y.; May 26 near Alpine, Ariz.; May 30 in Lapeer Co., Mich.; September 6 at Robson, B. C.; September 7 at Bayview Ridge, Skagit Co., Wash.; September 8 at San Francisco, Calif.; and "Sept." in Itasca State Park, Minn.

There is a rearing from a "tortricid," Batholomew River, N. B., 1939, by the Canadian Forest Insect Survey.

In our experience, the species is common in open, semidesert areas of the west, where there are grasses and shrubs. At Leevining, Calif., we found it abundant in *Ceanothus* bushes. In the East it is rare, and restricted to Canadian, Hudsonian, and Arctic areas.

This species is transcontinental in the Hudsonian and Canadian zones, occurring in rather dry open areas. It is rare in the East.

18. Exochus dentifrons, new species

Figure 192,i

Front wing 4.5 to 5.2 mm. long; frons below the middle with a median, high lamellate carina or tooth that almost touches the interantennal process of the face; nervulus beyond basal vein by about 0.4 its length; second abdominal tergite with rather coarse strong punctures, the interspaces of which are about 0.7 their diameter, the punctures evenly distributed but lacking from the apical 0.15 of the tergite.

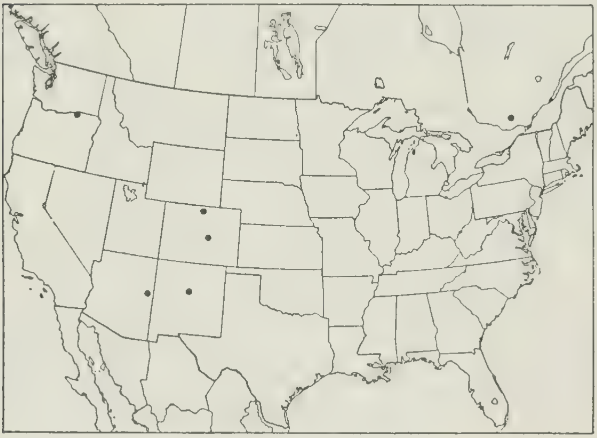


Figure 122.—Localities for *Exochus dentifrons.*

Male: Black. Upper 0.4 of face pale yellow except for a median ventral notch in the yellow area; yellow spot near top of each eye, the spots elongate, a little convergent posteriorly, close to hind ocelli, and a little separated from margin of eye; mandible and palpi mostly pale brown; tegula pale yellowish; legs fulvous, the basal 0.2 of tibiae, apical 0.12± of femora, and much of the front and middle coxae and trochanters, pale yellowish; tarsi stramineous; front and middle coxae basally blackish; hind coxa entirely blackish. Described from a single specimen.

Female: Black. Face, clypeus, and front part of cheek pale yellow, with a median vertical mark on face, a transverse mark between clypeal foveae, and apex of clypeus blackish, these dark marks often united; yellow spot near top of each eye, the spots elongate, weakly convergent posteriorly, close to hind ocelli, and a little separated from margin of eye; mandible mostly yellow; palpi light brown; tegula yellow, fulvous apically; coxae fulvous to black, the rest of legs fulvous with the basal 0.2 of tibiae yellowish, and the tarsi basally pale fulvous and apically tinged with brown.

Type: ♀, Florissant, Colo., June 26, 1908, S. A. Rohwer (Washington, USNM 63654).

Paratypes: ♀, near Alpine, Ariz., May 25, 1947, H. and M. Townes (Townes). ♀, Tanbark Flat, Los Angeles Co., Calif., June 23, 1956, R. C. Betchel (Davis). ♀, near Estes Park, Colo., June 15, 1948, H., M., G., D., and J. Townes (Townes). ♂, Monzano, N. Mex., June 26, 1941, R. H. Beamer (Lawrence). ♀, Boardman, Oreg., June 4, 1943, G. R. Ferguson (Corvallis). ♀, Kazubazua, Que., June 24, 1935, G. S. Walley (Ottawa).

This species has been taken sparingly from Quebec to Arizona, from May 25 to June 26. It seems to occur in moderately dry situations.

VIII. ATRICEPS GROUP

Front wing 3.8 to 4.7 mm. long; head round in front view, the cheek short; temple moderately long, moderately rounded; interantennal process of face moderate, its point with a 95-degree angle; frons rather weakly convex, weakly impressed above each antennal socket; occipital carina absent dorsally and below, present laterally as a fine weak carina; clypeal margin weakly convex, its median half subtruncate; head blackish, the face, side of frons (usually continuous to top of eye and widened there), clypeus, cheek, and lower part of temple, ivory; notaulus short, like a subcircular pit at margin of mesoscutum; metapleurum without discal hairs; propodeum smooth above, without carinae; costula entirely absent; median longitudinal carinae of propodeum entirely absent except for very short stubs at base of propodeum; apical transverse carina of propodeum entirely absent mesad of lateral longitudinal carinae or present as short stubs on the lateral longitudinal carinae; basal half of lateral longitudinal carina absent; second lateral area of propodeum almost completely covered with moderately dense hairs, only the posterior mesal part bare; nervellus beyond the basal vein by about 0.5 its length; front spur of middle tibia about 0.40 as long as hind spur; second segment of middle tarsus about 1.3 as long as wide in male, about 1.1 as long as wide in female; hind tibia whitish on its basal 0.2, the rest fulvous or infuscate; first tergite about 1.4 as long as its width at the basal corners, its median dorsal carinae exceptionally short, extending 0.2 to 0.3 its length; second abdominal tergite about 0.80 as long as wide, with moderate-sized punctures the interspaces of which are about 1.3 their diameter, the punctures almost lacking on the apical 0.15± of the tergite; epipleurum of third tergite truncate posteriorly, the inner margin evenly convex.

19. Exochus atriceps Walsh

Figures 188,h; 189,f; 192,j

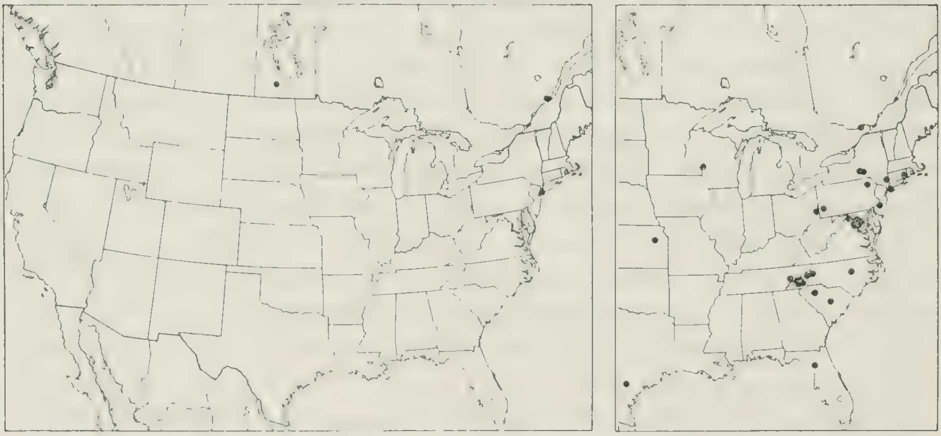
Front wing 3.8 to 4.7 mm. long. Structural characters as described under the species group. This is the only Nearctic *Exochus* with basal half of the lateral longitudinal carina of the propodeum absent.

There are two subspecies which differ in coloration as described below:

1. Mesopleurum and abdomen entirely blackish.
19a. atriceps atricorpus, new subspecies
Mesopleurum and abdomen largely or entirely fulvous.
19b. atriceps atriceps Walsh

19a. Exochus atriceps atricorpus, new subspecies

Blackish. Face, side of frons entirely or with a narrow subdorsal interruption, large subtriangular spot at top of eye (curving a little around hind ocellus and usually continuous with mark on side of frons), cheek, adjacent part of temple, mouth parts, under side of scape, upper margin of pronotum, tegula, subtegular ridge, and usually a spot on upper part of prepectus, ivory; front coxa broadly, middle coxa moderately, and hind coxa narrowly whitish apically, the rest of the coxae fulvous to brown; front and middle trochanters ivory, fulvous above; femora fulvous, the front and middle femora whitish apically and the hind femur infuscate at apex; basal 0.2 of tibiae whitish, the rest of the tibiae fulvous to brown; tarsi brown,



Figures 123, 124.—Localities, subspecies of *Exochus atriceps:* 123 (left), *atricorpus;* 124 (right), *atriceps.*

paler basally; sides and apical margin of abdominal tergites sometimes tinged with fulvous.

This is a northern form with the darker coloration that usually goes with the more northern distribution. Specimens tending to be intermediate are common, though only one (a male from Takoma Park, Md.) is at hand which cannot be assigned definitely to this subspecies or to the typical subspecies.

Type: ♂, beaten from *Abies*, "Lowelltown," Maine, June 5, 1945, F. Manning (Washington, USNM 63655).

Paratypes: ♀, Aweme, Man., July 10, 1922, R. M. White (Ottawa). ♀, Jacquet River, N. B., July 7, 1940, G. S. Walley (Ottawa). ♀, June 1, 1895, Quebec (Ottawa). 2♂, 1♀, no data (Ottawa).

This subspecies occurs in the Canadian zone of the East.

19b. Exochus atriceps atriceps Walsh

Exochus atriceps Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 95; ♂. Type: ♂, ?Illinois (destroyed in Chicago fire of 1871).

Exochus rufomaculatus Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitent des hyménoptères, p. 113; ♀. Type: ♀, Ottawa, Ont. (Ottawa).

Fulvous. Face, side of frons (usually broadly and continuous to top of eye), large triangular area at top of eye (continuous with mark at side of frons and curving a little around hind ocellus), cheek, lower part of temple (continued dorsally along hind margin of eye), clypeus, mouth parts, broad upper margin of pronotum, tegula, subtegular ridge, much or all of lateral part of prepectus, often tinges on sides and apex of scutellum and on postscutellum, ivory; head blackish except as described otherwise; antenna blackish brown, the under side of scape ivory; thorax usually with a little to extensive blackish areas in front, on margins of mesoscutum, near wing bases, and beneath; front and middle coxae whitish, fulvous basally; hind coxa fulvous, whitish apically beneath; front and middle trochanters whitish, tinged with fulvous above; femora fulvous, the front and middle femora whitish apically and the hind femur usually a little infuscate at apex (front femur sometimes whitish in front and brownish behind); tibiae fulvous, whitish on their basal 0.2 and the front tibia whitish in front; tarsi fulvous, the hind tarsus paler basally and elsewhere tinged with brown; abdomen often infuscate at base and apex.

The type of *E. rufomaculatus* is somewhat intermediate to the subspecies *E. a. atricorpus*.

Specimens (55♂, 39♀): From Connecticut (Lebanon); Florida (2 miles west of Archer); Kansas (Lawrence); Maryland (Cabin John and Takoma Park); New Jersey (Moorestown); New York (between Ellis Hollow and Slaterville, Farmingdale, Flatbush, and Poughkeepsie); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Hamrick, Linville Falls, Mount Mitchell at 6,400 ft., Mount Pisgah at 5,000 to 5,749 ft., and Wake Co.); Ohio (Bridgeport); Ontario (Ottawa); Pennsylvania (Allegheny Co., Powermill Nature Reserve in Westmoreland Co., and Spring Brook); South Carolina (Columbia and Greenville); Tennessee (Sevierville); Texas (San Antonio); Virginia (Barcroft, Chain Bridge, East Falls Church, Falls Church, and Rosslyn); West Virginia (Bolivar); and Wisconsin (La Crosse Co.).

Adults occur from rather early spring to rather late fall. Early and late seasonal catches are: March 23 near Archer, Fla.; April 4 at San Antonio, Tex.; April 23 in Wake Co., N. C.; April 25 at Columbia, S. C.; May 9 at Takoma Park, Md.; October 3 at Greenville, S. C.; October 11 at Falls Church, Va.; and October 28 at Takoma Park, Md.

We find the subspecies flying about shrubs or low trees in open deciduous woods or overgrown fields, in relatively dry habitats. It is one of the species of *Exochus* with a strong odor.

This subspecies occurs in the Alleghenian, Carolinian, and Austroriparian faunas. Adults fly through most of the growing season and are moderately common in open dry woods or overgrown fields.

IX. SULCATUS GROUP

Front wing 3.8 to 4.0 mm. long; head tapered to narrow mouth, the temples rather narrow; face moderately convex, its interantennal process short, its point with a 120-degree angle; frons approximately flat but with a conspicuous median longitudinal swelling below the front ocellus; occipital carina absent; clypeal margin convex, the curvature somewhat flattened medially; head pale stramineous, the occiput and area surrounding the ocelli blackish; notaulus moderately long and distinct; sternaulus exceptionally distinct, rather sharp and extending about 0.3 the length of the mesosternum; metapleurum without discal hairs; costula, median longitudinal carinae, and apical transverse carina of propodeum all strong; second lateral area of propodeum with a few hairs apically, or bare; nervulus beyond basal vein by 0.5 its length; front spur of middle tarsus about 0.60 as long as hind spur; second segment of middle tarsus about 2.05 as long as wide in male, about 1.7 as long as wide in female; hind tibia pale stramineous, its base infuscate and its front side with a weakly infuscate stripe; first tergite about 2.4 as long as its width at basal corners; second abdominal tergite about 0.68 as long as wide, its punctures exceptionally fine and weak, their interspaces about 4 to 7 times their diameter; epipleurum of third tergite moderately wide, subtruncate posteriorly, its mesal and basal margin evenly convex.

This group contains the Nearctic species described below, which is known only in the male sex. A female specimen, from Venezuela, may represent the other sex of the same species or may belong to a second species of the group.

20. Exochus sulcatus, new species

FIGURES 188,i; 189,g; 193,a

Male type: Front wing 4.0 mm. long; punctures on frons separated by about 1.5 their diameter; second lateral area of propodeum with about five hairs apically; punctures on second abdominal tergite separated by about 4 times their diameter; apex of clasper strongly depressed so that from above it appears obliquely truncate.

Very pale stramineous. Spot enclosing ocelli and expanded on occiput, blackish; scape and flagellum blackish; mesoscutum blackish, its hind margins and a pair of short, obscure median lines stramineous; postscutellum and disc of scutellum blackish; propodeum with a large, median equilateral blackish triangle, the base of the triangle on the base of the propodeum; basal 0.18 of hind tibia infuscate; front face of hind tibia with a faintly infuscate stripe; abdomen blackish, pale stramineous below, on the base and side of the first tergite, side of the second tergite, and broad apicolateral corner, broad lateral edge, and narrow apical edge of third and following tergites.

Type: ♂, Moorestown, N. J., July 21, 1939, H. and M. Townes (Washington, USNM 63656).

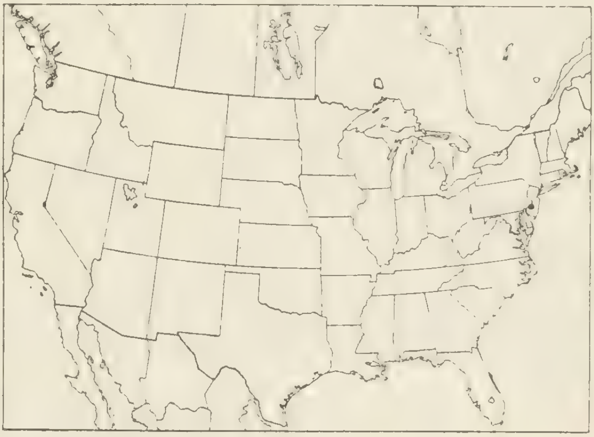


FIGURE 125.—Locality for *Exochus sulcatus.*

We have also a female specimen (San Esteban, Venezuela, Dec. 20, 1939, P. J. Anduze (Townes)) which may belong to this species. It differs from the male only in being a little more sparsely punctate and in minor color characters. This is the specimen that was used for the figures cited above.

X. TIBIALIS GROUP

Front wing 3.2 to 7.5 mm. long; head about average for the genus, the temple moderately long, cheek short, and face moderately to rather strongly convex; interantennal process blunt to acute; median part of frons very weakly to strongly differentiated and protuberant, rarely with a high median ventral ridge; occipital carina absent or present laterally as a weak vestige; median 0.6 of clypeal margin straight or weakly concave; head black, the face usually mostly or entirely white or yellow but sometimes entirely black; orbital marks on frons usually absent or incomplete, rarely complete; spot at top of eye usually large, but rarely vestigial or absent, subtriangular, adjacent to eye; notaulus moderate, rather short; metapleurum rarely with a few discal hairs; costula present or absent; median longitudinal carinae and apical transverse carina of propodeum complete, the median longitudinal carinae strongly bent inward just basad of position of costula; second lateral area of propodeum with hairs in its apicolateral corner and usually also some hairs laterally, usually bare elsewhere; nervulus beyond basal vein; front spur of middle tibia 0.4 to 0.6 as long as hind spur; second segment of middle tarsus 1.0 to 1.5 as long as wide; hind tibia sometimes uniformly colored but usually infuscate apically and often infuscate basally, never with a subbasal infuscate band; first tergite 1.4 to 2.5 as long as its width at basal corners; second tergite about 0.6 to 1.6 as long as wide, with moderate-sized, rather sharp punctures that are sparse or absent on median part of tergite; epipleurum of third tergite subtruncate apically, its inner margin evenly arcuate or strongly arcuate basally and almost straight postmedially.

This group is the dominant one in the Holarctic region. We have seen also a few representatives from the Oriental and Neotropic regions. Thirty-three Nearctic species are described below and there are doubtless many more to be discovered. The Palaearctic species that we have seen and would assign to this group are: *Exochus alpinus* Zetterstedt, 1838; *E. lentipes* Gravenhorst, 1829; *E. semilividus* Vollenhoven, 1875; *E. suishanus* Uchida, 1932; *E. tardigradus* Gravenhorst, 1829; *E. thomsoni* Schmiedeknecht, 1925; and *E. tibialis* Holmgren, 1856.

21. Exochus annulicrus Walsh

FIGURES 189,h; 193,b

Exochus annulicrus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 95; ♂. Type: ♂, ?Illinois (destroyed in Chicago fire of 1871).

Front wing 3.5 to 4.5 mm. long; combined face and clypeus 1.10 as high as wide, evenly convex, the horizontal convexity a little greater than the vertical convexity; facial punctures of median size, sharp, their interspaces about 0.8 their diameter; interantennal process of moderate length, its apical angle about 95 degrees; median swollen area of frons rather weakly defined; occipital carina rather narrowly incomplete above; clypeus moderately wide, the median half of its apical margin faintly concave; mandible elongate triangular, tapered evenly from the base to a rather slender apex; frons weakly and evenly convex, a little impressed above each antennal socket and weakly swollen between these impressions; hind ocellus separated from eye by about 0.85 its long diameter; hind margin of mesosternum with an unusually conspicuous median shelf, on each side of which is a blunt small lobe; costula complete and strong; second lateral area of propodeum with about 7 hairs laterally and apicolaterally; hind femur about 2.25 as long as deep in male, about 2.15 as long as deep in female; front spur of hind tibia exceptionally long for the *tibialis* group, about 4.1 as long as wide; punctures absent from middle of second tergite, elsewhere on this tergite of moderate size, rather weak, and separated by about their diameter; male clasper sparsely hairy below, densely so above, obliquely rounded from below to a blunt point.

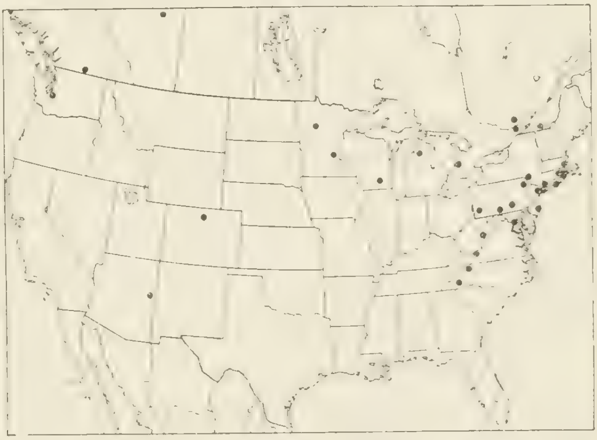


FIGURE 126.—Localities for *Exochus annulicrus*.

Male: Black. Face, usually narrow frontal orbits extending half the height of frons, medium-sized triangle at top of eye, cheek, adjacent temple, clypeus, mouth parts, under side of scape, hind corner of pronotum, usually lower part of propleurum, tegula, subtegular ridge, large area on prepectus, usually more or less of mesosternum, usually postscutellum and apex of scutellum, and front and middle coxae, pale yellow; front and middle legs beyond coxae light fulvous, pale yellowish on knees and in front; hind coxa fulvous, pale yellow below; hind trochanters pale yellow, tinged with fulvous; hind femur fulvous, weakly infuscate at apex; hind tibia infuscate on its basal 0.2±, whitish on its next 0.2± (a little more extensively dorsally), and fuscoferruginous on its apical 0.6, darkest near the apex; hind tarsus whitish, the apex of each segment brown.

Female: Black. Face blackish brown, its upper margin stramineous; narrow frontal orbits on lower half of frons stramineous; small triangle at top of eye pale yellow; lower margin of clypeus broadly, more or less of cheek, mouth parts, and under side of scape, stramineous; long hind corner of pronotum yellowish tinged with fulvous; lower part of pronotum fulvous; tegula and subtegular ridge pale yellow; scutellum and postscutellum obscurely ferruginous, each with a narrow transverse yellowish mark at apex; front and middle legs fulvous, their tibiae basally and tarsi paler; hind coxa, trochanters, and femur fulvous; hind tibia dusky fulvous, darker on basal 0.2 and dorsally, its second 0.2± whitish; hind tarsus stramineous, the apex of each segment light brown.

This species is close to the European *Exochus semilividus* Vollenhoven, 1875, and has considerable resemblance to the Nearctic *E. washingtonensis*, in the *pullatus* group.

Specimens (17♂, 16♀): From Alberta (Edmonton); Arizona (near Alpine); British Columbia (Oliver); Colorado (near Estes Park); Connecticut (Green Falls and Stamford); Maryland (Takoma Park); Massachusetts (Franklin); Michigan (Kalkaska Co.); Minnesota (Itasca State Park and Ramsey County); New Brunswick (Pokemouche); New Jersey (Lahaway in Ocean Co. and Westfield); New York (Cold Spring Harbor, Hancock, and Sea Cliff); North Carolina (Hamrick and Mount Pisgah at 4,600 ft.); Ontario (Constance and Mer Bleue (near Ottawa)); Pennsylvania (DuPont, Harrisburg, near Webster Mills, and Westmoreland Co.); Quebec (Kazubazua and Knowlton), Rhode Island (Charlestown and Kingston); Virginia (Summit of Butte Mt. in Giles Co.); Washington (Ashford); West Virginia (Cheat Mt. at 2,000 ft.); and Wisconsin (Madison).

Collecting dates are distributed from late May to September. Some early and late seasonal records are: May 25 near Alpine, Ariz.; May 26 at Franklin, Mass.; May 30 at Westfield, N. J.; June 6 at Constance, Ont.; September 2 on Mount Pisgah, N. C., at 4,600 ft.; September 18 at Mer Bleue (near Ottawa), Ont.; and "Sept." in Itasca Park, Minn.

This species is transcontinental in the Transition zone.

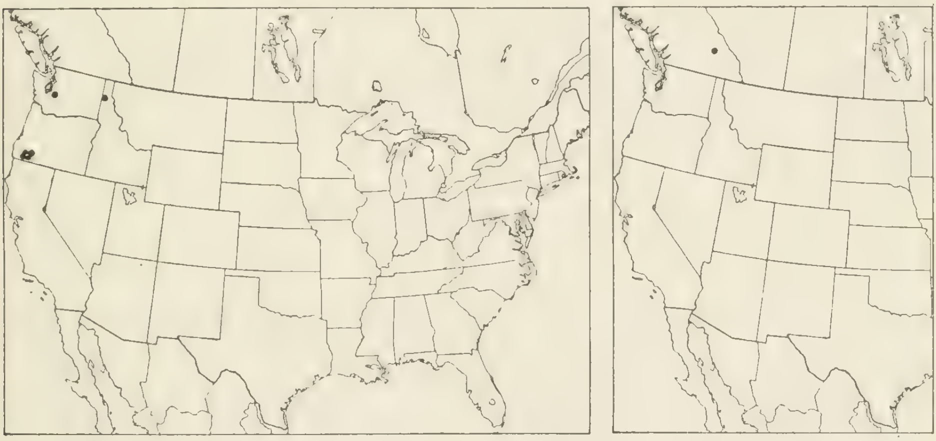
22. Exochus evetriae Rohwer

FIGURES 189,i; 193,c

Exochus evetriae Rohwer, 1920, Proc. U. S. Nat. Mus., vol. 57, p. 223; ♀. Type: ♀, Butte Falls, Oreg. (Washington).

Front wing 3.7 to 6.8 mm. long; combined face and clypeus about 0.98 as high as wide, rather weakly convex, flattened medially; facial punctures coarse and strong, their interspaces about 0.3 their diameter; point of interantennal process with an angle of about 95 degrees; median swollen area of frons very weakly defined; clypeus very wide, its apical margin broadly but weakly concave; mandible heavy, its outer face closely punctate, tapered uniformly to a broad apex, the two teeth only a little unequal; hind ocellus separated from eye by about 1.0 its long diameter in male, by about 1.4 its long diameter in female; temple more roundly swollen than in any other member of the *tibialis* group, the head about as wide across midlength of temples as across eyes; flagellum of female short and blunt-tipped, its postmedian segments wider than long; costula incomplete; second lateral area of propodeum bare or with a few hairs basally and apicolaterally; hind femur about 2.25 as long as deep in male, about 2.15 as long as deep in female; front spur of hind tibia about 3.3 as long as wide in male, about 3.6 as long as wide in female; punctures of second tergite rather coarse, sharp, and dense, sublaterally their interspaces about equal their diameter, medially their interspaces about 1.3 their diameter; apex of male clasper tapered to a blunt point.

Black. Palpi brown; a small brown spot at top of eye; tegula brown; legs beyond first trochanters uniformly dark fulvous.



FIGURES 127, 128.—Localities: 127 (left), *Exochus evetriae;* 128 (right), *E. hiulcus.*

Specimens: 2♂, reared from *Barbara colfaxiana*, Coeur d'Alene, Idaho, May 24, 1935, H. J. Rust (Washington). 3♀, reared from hosts on *Pseudotsuga taxifolia*, Ashland, Oreg., 1913 and 1915, F. P. Keen and J. E. Patterson (Washington). ♀, reared from host in *Polyporus dryophilus*, Applegate River, Oreg., 1916, J. E. Patterson (Washington). ♀ (type), reared from pupa of *Barbara colfaxiana siskiyouana*, Butte Falls, Oreg., J. M. Miller and P. D. Sargent (Washington). 5♂, reared from pupae of *B. colfaxiana taxifoliella*, Grants Pass, Oreg., J. M. Miller and P. D. Sargent (Washington). ♂, Mount Rainier at 5,500 ft., Wash., July 23, 1940, H. and M. Townes (Townes).

This species occurs in Washington, Oregon, and Idaho. It parasitizes *Barbara* in cones of conifers.

23. Exochus hiulcus, new species

Figures 189,j; 193,d

Female type: Front wing 4.7 mm. long; combined face and clypeus 1.03 as high as wide, rather weakly, uniformly convex; facial punctures strong and rather coarse, their interspaces about 0.5 their diameter; point of interantennal process with an angle of 90 degrees; median swollen area of frons weakly defined; clypeus very wide, the median 0.75 of its apical margin straight in front view and the lateral 0.125 weakly upturned; mandible broad, its lower margin a little convex to make the taper more abrupt apically, its lower tooth very short, its outer face densely punctate; hind ocellus separated from eye by 1.0 its long diameter; costula complete but weak; second lateral area of propodeum with a few hairs basally and apicolaterally; hind femur 2.05 as long as deep; front spur of hind tibia 2.9 as long as wide; punctures of second tergite of moderate size, sharp, evenly distributed, their interspaces about equal to their diameter.

Black. Mandible and palpi brown; a small faint pale spot at top of eye; tegula pale yellow, its apical half fulvous; legs uniformly fulvous.

Type: ♀, Rogers Pass (near Glacier), B. C., Aug. 1, 1908, J. C. Bradley (Ithaca).

24. Exochus nigripalpis Thompson

Figure 189,*k*

Front wing 3.2 to 6.2 mm. long; combined face and clypeus about 1.0 as high as wide in male, about 1.20 as high as wide in female, moderately convex in the vertical direction, strongly convex transversely; facial punctures coarse and strong, their interspaces about 0.5 their diameter; point of interantennal process with about a 60-degree angle; median swollen area of frons rather weakly defined; median 0.6 of apical margin of clypeus truncate; lower margin of mandible convex to make the taper of the mandible a little abrupt apically, the apex of mandible moderately narrow, its lower tooth short; outer face of mandible with sparse, rather coarse punctures; hind ocellus separated from eye by about 1.1 its long diameter in male, by about 1.2 its long diameter in female; costula strong, usually complete; second lateral area of propodeum with hairs laterally and apicolaterally; hind femur about 2.45 as long as deep in male, about 2.35 as long as deep in female; front spur of hind tibia about 3.1 as long as wide in male, about 3.4 as long as wide in female; punctures on second abdominal tergite of moderate size and sharpness, sublaterally moderately dense, their interspaces about 2.0 their diameter, medially very sparse; apex of male clasper obliquely rounded off from below.

The general coloration is black, with the legs mostly or entirely fulvous, and usually with a broad whitish border on the interantennal process. Details of coloration vary between the three subspecies, as described below:

1. Coxae and trochanters blackish; interantennal process entirely black; range: Europe . . . . **24a. nigripalpis nigripalpis** Thompson
   Coxae and trochanters fulvous, the coxae sometimes more or less blackish . 2
2. Front and middle coxae of male yellowish fulvous beneath; interantennal process of face broadly bordered with white; range: Transcontinental in Canadian and Transition zones, except California.
   24b. nigripalpis tectulum, new subspecies
   Front and middle coxae of male fulvo-ferruginous beneath; interantennal process of face very narrowly bordered with white, or entirely black; range: California . . . . **24c. nigripalpis subobscurus,** new subspecies

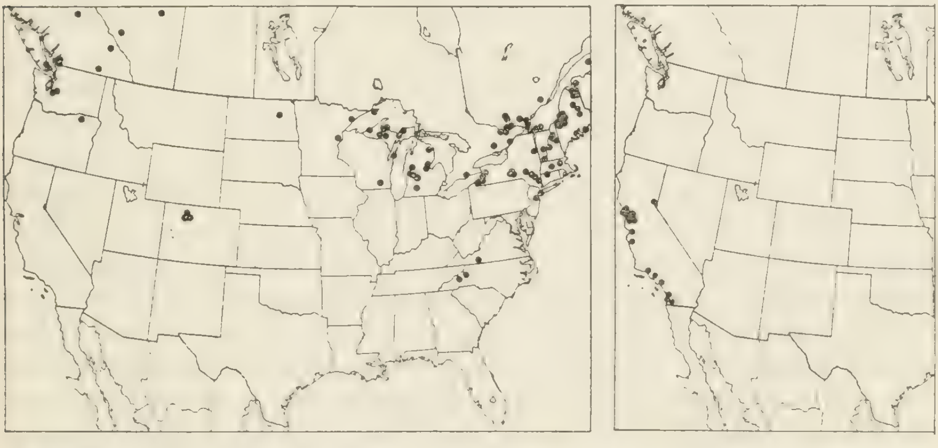
24a. Exochus nigripalpis nigripalpis Thompson

Exochus nigripalpis Thompson, 1887, Deutsche Ent. Zeitschr. vol 31, p. 209; ♀. Lectotype (hereby selected): ♀, labeled "Ört." (Lund).

Front wing 5.5 to 6.0 mm. long.

Black. Interantennal process entirely black; palpi brown; flagellum brownish beneath; tegula light brown, yellow basolaterally; coxae and first trochanters blackish; legs beyond first trochanters fulvous, the apex of front femur, tibiae basally, and middle and hind tarsi basally, indistinctly paler.

Described from a male specimen from Germany and a female from Sweden, both of which have been compared with Thompson's type.



FIGURES 129, 130.—Localities; subspecies of *Exochus nigripalpis:* 129 (left), *tectulum;* 130 (right), *subobscurus.*

24b. Exochus nigripalpis tectulum, new subspecies

FIGURES 163,b; 179,j; 189,k; 193,e

Front wing 4.2 to 6.2 mm. long.

Black. Interantennal process broadly bordered with whitish, the white border about half as wide as the flagellum, small yellowish spot sometimes at top of eye; palpi and sometimes tip of mandible stramineous to light brown; flagellum dark brown beneath; hind corner of pronotum sometimes with a whitish mark; tegula pale fulvous to brown, pale yellow basally and sometimes with a small pale yellow area apicolaterally; legs fulvous, the coxae infrequently more or less infuscate, especially basally, the male front and middle coxae pale fulvous beneath, and the apex of front femur, front and middle tibiae, hind tibia basally, and tarsi basally, a little paler. Legs of female more uniformly fulvous than those of male. In some laboratory reared males the whitish mark on the interantennal process is expanded to cover a large portion of the face, and the cheek and mouth parts also may be whitish.

Type: ♂, Ithaca, N. Y., May 31, 1936, H. Townes (Washington, USNM 63657).

Paratypes (128♂, 128♀): From Alberta (Banff, Edmonton, and Slave Lake); British Columbia (Downie Creek in the Selkirk Mts., Duncan, Esquimalt, Chilliwack, Cultus Lake, Robson, Stanley, and Vancouver); Colorado (Boulder Canyon, Glen Haven, and Peaceful Valley in Boulder Co.); Connecticut (Colebrook); Idaho ("Houser Lake"); Maine (Ashland, Coburn Gore, Fort Kent, Jackman, Lincoln Co., Millinocket, Mount Chase near Patten, Patten, Rangeley, Rockwood, Smyrna Mills, St. Agathe, Seboomook area, Shin Pond, Sinclair, South West Harbor, and The Forks); Massachusetts (Holliston and South Hadley); Michigan (Alger Co., Alpena Co., Baraga Co., Bay Co., Calhoun Co., Delta Co., Dickinson Co., Iron Co., Isle Royale, Mackinac Co., Marquette Co., Mecosta Co., Midland Co., Montcalm Co., Newaygo Co., Ontonagon Co., and Osceola Co.); Minnesota (Isabella and Pine Co.); New Brunswick (Green River and Tabusintac); New Hampshire (Hanover, Pinkham Notch, Randolph, and Mount Madison); New Jersey (Milltown); New York (Bemus Point, Bethpage, Connecticut Hill in Tompkins Co. at 2,095 ft., Gowanda, Green Co., Hamburg, Ithaca, Lake George, Lancaster, McLean Bogs in Tompkins Co., Oneonta, Poughkeepsie, Rock City in Cattaraugus Co., Shokan, and Upper Ausable Lake in Essex Co.); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft. and Mount Mitchell at 5,200 ft. and at 6,400 ft.); North Dakota (Devil's Lake); Nova Scotia (Baddeck, Kentville, Kings Co., St. Peters, and Truro); Ontario (Bells Corners, Brockville, Galetta, Madoc, and St. Williams); Oregon (Cottage Grove, 8 miles west of Meachan at 3,400 ft., and "Sodaville");

Pennsylvania; Prince Edward Island (Brackley Beach in Canadian National Park and Dalvay House in Canadian National Park); Quebec (Aylmer, Brome, Cascapedia River, Cross Point, Hemmingford, Hull, Kazubazua, Magog, Montreal, St. Esprit, Ste. Agathe des Montes, Stoneham, and Wright); Vermont (Laurel Lake near Jacksonville and Woodstock); Virginia (Galax); Washington (Ashford, Mount Rainier at 4,700 ft., and Summerland Trail on Mount Rainier); and Wisconsin (Door Co. and Madison).

Dates of collection show that adults occur through the growing season, with greatest abundance in July and August. Particularly early and late dates of capture are: April 17 at Bethpage, Long Island, N. Y.; May 9 and 17 at Ithaca, N. Y.; May 15 at South Hadley Mass.; May 16 in Mecosta Co., Mich.; May 23 in Pine Co., Minn.; May 24 at Houser Lake, Idaho; May 25 at Hull, Que., and at Magog, Que.; May 26 at Robson, B. C. and at McLean Bogs Reserve in Tompkins Co., N. Y.; September 18 and October 2 in Midland Co., Mich.; September 25 at McLean Bogs Reserve in Tompkins Co., N. Y., and at Cross Point, Que.; October 1 at Madison, Wis.; and October 17 and 18 at Chilliwack, B. C.

There are many records of rearings from *Choristoneura fumiferana* on the pin labels of these specimens from localities across the continent. It is noteworthy that all dates of emergence from these rearings are between June 20 and August 9, with most of them in July. This is probably the result of the seasonal life history of this particular host. The localities recorded for these rearings are in British Columbia (Duncan, Esquimalt, and Green River); Maine (Ashland, Coburn Gore, Millinocket, Mount Chase near Patten, Rangeley, Rockwood, Smyrna Mills, St. Agathe, Seboomook area, Shin Pond, Sinclair, and The Forks); Minnesota (Isabella); and Oregon (Cottage Grove and Sodaville). There are two additional rearings from another host: ♂, from *Archips rosana*, St. Peters, N. S., July 22, 1930, M. L. Prebble; and ♀, from *Archips rosana*, Baddeck, N. S., July 24, 1936, J. McDunnough.

We have notes from one day's collecting that captured specimens of this species failed to give off the strong odor typical of the genus *Exochus*. More observations are needed before it could be stated that the species always lacks this odor.

This subspecies is transcontinental in the Canadian and Transition zones. It is a common parasite of *Choristoneura fumiferana*. Adults occur throughout the warmer part of the season.

24c. Exochus nigripalpis subobscurus, new subspecies

Front wing 3.2 to 5.7 mm. long.

Black. Interantennal process entirely black or narrowly bordered with whitish; palpi brown; tegula brown, yellow basolaterally; legs fulvoferruginous, the coxae usually a little infuscate basally and the apex of front femur, tibiae basally, and middle and hind tarsi basally, faintly paler.

Type: ♂, Mill Valley, Calif., July 30, 1948, H. and D. Townes (Washington, USNM 63658).

Paratypes (24♂, 20♀): From California (Avancino, Bear Valley in Marin Co., Berkeley, Carlsbad, Diamond Creek in Alameda Co., Fort Ord, Fullerton, Glendale, Hawthorne, Ingleside, Inverness, La Jolla, Lake Tahoe, Mill Valley, Oakland, San Diego, San Francisco, San Lorenzo, Santa Paula, and Watsonville). Dates on the specimens are mostly in April, May, June, July, and September. Those outside of these months are: January 3 at Berkeley; January 4 at Santa Paula; February 7 at Watsonville; February 18 at Fort Ord; March 13 at Oakland; March 15 at San Lorenzo; March 25 at Berkeley; August 26 at Ingleside; October 6 at Inverness; October 26 at San Francisco; November 22 at Berkeley and at Oakland; and December 15 at Carlsbad.

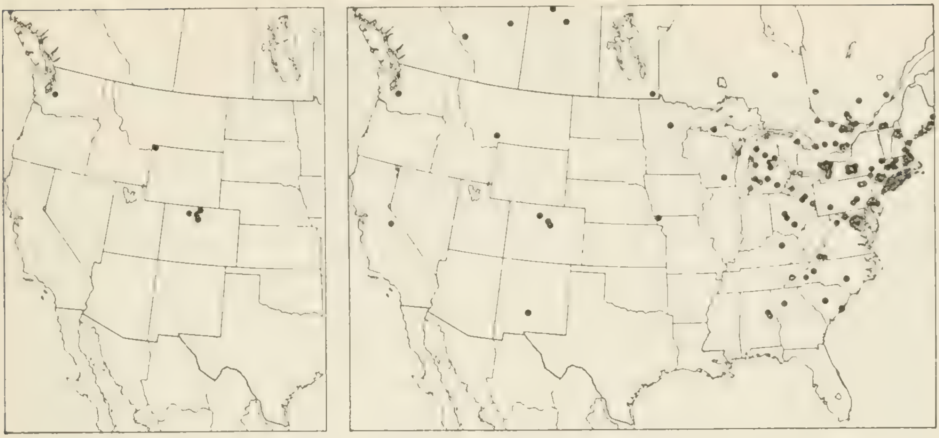
Adults seem to be on the wing throughout the year. Reared specimens are as follows: 3♂, from leaf tyer on *Rosa*, Avancino, Calif., July 1939, R. M. Bohart; ♂, from *Platynota stultana*, San Lorenzo, Calif., Mar. 15, 1941; ♂, from carnation worm, Hawthorne, Calif., Sept. 21, 1940, R. M. Bohart; ♀, from *Argyrotaenia franciscana*, San Francisco, Calif., Apr. 8, 1925, H. H. Kiefer; ♀, from *A. franciscana*, Watsonville, Calif., Feb. 7, 1921, E. O. Essig; ♀, from tortricid pupa, San Francisco, Calif., Apr. 20, 1909, F. X. Williams; ♂, from *A. citrana*, Santa Paula, Calif., Jan. 4, 1951, Adkins; ♀, from *A. citrana*, Fullerton, Calif., June 28, 1951, Adkins; and 2♂, from tortricid, Carlsbad, Calif., Dec. 15, 1949, R. J. Pence.

This subspecies is in California, in the Upper Sonoran and Transition faunas.

25. Exochus tenebrosus, new species

FIGURES 189,l; 193,f

Front wing 4.2 to 4.5 mm. long; combined face and clypeus of male about 0.90 as high as the face is wide, of female about 0.70 as high as the face is wide, rather strongly convex in a vertical plane, more strongly convex horizontally; facial punctures rather coarse and sharp, their interspaces about 0.8 their diameter in male, about 1.0 their diameter in female; point of interantennal process with about a 90-degree angle; frons weakly swollen medially; median 0.6 of apical margin of clypeus truncate; lower margin of mandible weakly convex to make the taper of the mandible a little abrupt apically, the apex of the mandible moderately narrow, its lower tooth short; outer face of mandible with sparse, rather coarse punctures; hind ocellus sep-



FIGURES 131, 132.—Localities: 131 (left), *Exochus tenebrosus;* 132 (right), *E. albifrons.*

arated from eye by about 1.0 its long diameter in male, by about 1.3 its long diameter in female; costula strong and complete; second lateral area of propodeum about 1.7 as long as wide, with a few hairs apicolaterally; hind femur about 2.52 as long as deep in male, about 2.22 as long as deep in female; front spur of hind tibia about 3.2 as long as wide in male, about 3.5 as long as wide in female; punctures on second tergite moderately small, not particularly sharp, sublaterally separated from each other by about 1.5 their diameter, medially very sparse; male clasper moderately wide, its apex elliptically rounded.

Black. Interantennal process of frons in male often margined with stramineous; usually a small brown spot at top of eye; palpi and tegula dark brown; legs blackish or very dark brown.

Type: ♀, Phantom Valley, Rocky Mountain National Park, at 9,400 ft., Colo., Aug. 10, 1948, H., M., D., and J. Townes (Washington, USNM 63659).

Paratypes: ♂, ♀, Phantom Valley, Rocky Mountain National Park, at 9,400 ft., Colo., Aug. 9 and 10, 1948, H., M., D., and J. Townes (Townes). 10♂, 1♀, Poudre Lake, Rocky Mountain National Park, at 11,000 ft. and at 11,600 ft., Colo., Aug. 10, 11, and 12, 1948, H., M., G., D., and J. Townes (Townes). 2♂, Rabbit Ears Pass at 9,500 ft., Colo., Aug. 7, 1948, H., M., G., and D. Townes (Townes). ♂, Mount Rainier at 4,700 ft., Wash., July 11, 1940, H. and M. Townes (Townes). 2♂, Dunraven Pass, Yellowstone Park, Wyo., Jul. 28, 1934, A. L. Melander (Cambridge).

We found the species in Colorado common among a low red-berried *Vaccinium* growing under evergreens. It was only there, and never in the open.

This species occurs on the undergrowth of forests a little below timberline, in Washington, Wyoming, and Colorado. Adults have been taken from July 11 to August 12.

26. Exochus albifrons Cresson

Figures 188,j; 189,m; 193,g

Exochus albifrons Cresson, 1868, Trans. Amer. Ent. Soc., vol. 2, p. 114; ♀. Type: ♀, Illinois (Philadelphia).

Front wing 3.8 to 7.9 mm. long; combined face and clypeus about 0.98 as high as wide in male, about 1.11 as high as wide in female, their vertical convexity uniform, rather weak, their transverse convexity a little stronger, their punctures coarse, separated by about 0.3 their diameter on face and by about 1.0 their diameter on clypeus; interantennal process with an apical angle of about 85 to 100 degrees; median swelling of frons weak, unusually narrow; median half of clypeal margin truncate or weakly concave; mandible broad basally, with sparse coarse punctures, evenly tapered to a moderately broad apex, its lower tooth small; hind ocellus separated from eye by about 0.95 its long diameter in male, by about 0.77 its long diameter in female; costula strong, complete, sometimes weak medially; second lateral area of propodeum with hairs laterally and apicolaterally, the rest bare; hind femur about 2.40 as long as deep; front spur of hind tibia about 3.2 as long as wide in male, about 3.3 as long as wide in female; punctures on second tergite moderately coarse and deep, practically absent medially, sublaterally separated by about 1.3 their diameter; male clasper tapered apically to a narrow rounded apex.

Black. Face, sometimes part or all of side of frons, triangular spot at top of eye, clypeus, cheek, temple next to mandible, mouth parts, often spot on scape beneath, upper margin of pronotum from apex usually to epomia (broadest near hind corner), much of subtegular ridge, often postscutellum and apex of scutellum, and tegula except for a postmedian light fulvous area, yellowish white. Face usually with a median subdorsal elongate fuscous mark, clypeus with the median part of apical margin usually blackish, and face sometimes with a blackish spot above each clypeal fovea. Often these dark marks are enlarged and more or less fused, often leaving the face entirely black except for a broad dorsal whitish margin. Antenna blackish brown, paler beneath. Frequently there is an ivory area on upper part of prepectus and at base of middle coxa, and the thoracic pleura are often more or less fulvous. Rarely the entire propodeum and some of the base of the abdomen may be pale and the scutellum entirely whitish. Legs fulvous, the trochanters, and front and middle coxae, tibiae and tarsi, pale fulvous, the apex of the tarsal segments faintly darker. Hind tibia whitish on basal 0.15±, fulvous from thence to near the apical 0.2±, the apical 0.2± fuscous; hind tarsus stramineous, the apex of its first four segments brown, the last segment brown with a pale base.

Specimens (207♂, 201♀): From Alabama (Pyriton and Wadley); Alberta (Banff, Blackfoot Hills near Wainwright, and "Fran River"); Arkansas (Siloam Springs); California (Yosemite Valley); Colorado (Eldorado, Peaceful Valley, and Steamboat Springs); Connecticut (East River, Ledyard, Old Lyme, New Haven, North Stonington, Voluntown, and Wallingford); District of Columbia (Rock Creek Park); Georgia (Atlanta); Illinois; Kentucky (Lexington); Maine (Bar Harbor, Casco, Dennysville, Lincoln Co., and South West Harbor); Manitoba (Whitemouth); Maryland (Bowie, Cabin John, Glen Echo, Plummers Island, and Takoma Park); Massachusetts (Amherst, Chester, Holliston, Lexington, Malden, Petersham, Revere, South Hadley, and Woburn); Michigan (Ann Arbor, Barry County, Benton Harbor, Gladwin Co., Higgins Lake, Iosco Co., Lake Co., Lansing, Mackinac Island, Manistee Co., Marian Island in Grand Traverse Co., Midland Co., Ottawa Co., and Ontonagon Co.); Minnesota (Cass Co.); Montana ("Rock Creek," and Madison River in Gallatin National Forest); New Brunswick (St. Andrews); New Hampshire (Durham, Mount Monadnock, Mount Washington, Pinkham Notch, and Randolph); New Jersey (Moorestown); New Mexico (South Fork of Eagle Creek in the White Mts. at 8,000 ft.); New York (Bemus Point, Cold Spring Harbor, East Aurora, Ellis Hollow, Farmingdale, Flatbush, Grand Isle, Hancock, Ithaca, Lake Mohonk, Lick Brook near Ithaca, Lockport, McLean Reserve in Tompkins County, North Evans, Oneonta, Onteora Mt. in Greene Co., Orient, Poughkeepsie, Riverhead, Sea Cliff, Slaterville Springs, Smithtown, Shokan, Taughannock Falls, and Troy); North Carolina (Clinton, Crabtree Meadows in Yancey Co. at 3,600 ft., Nantahala Gorge at 2,000 ft., and North Fork of Swannanoa River in the Black Mts.); Ohio (Akron, Barberton, Big Walnut Creek near Columbus, Bridgeport, Columbus, Delaware Co., Hocking Co., and "Puritas Springs"); Ontario (Blackburn, Bobcaygeon, Britannia, Camlachie, Chalk River, Constance Bay, Galetta, Gananoque, Grimsby, Hillsdale, London, Merivale, Millers Lake, Opasatika, "Overs Bay," Point Pelee, St. Davids, Tweed, and Widdifield Township); Pennsylvania (Dushore, Highspire, Mount Holly Springs, Philadelphia, Powdermill Nature Reserve in Westmoreland Co., Roxborough, Spring Brook, and Swarthmore); Prince Edward Island (Brackley Beach in Canadian National Park); Quebec (Aylmer, Brome, Clova, Hull, Kazubazua, Knowlton, Norway Bay, Rouyn, Stoneham, and Wright); Rhode Island (Hopkington and Westerly); Saskatchewan (Kinistino, Prince Albert National Park, and "Wallwest"); South Carolina (Columbia and McClellanville); Tennessee Ramsey, Cascades Trail in Great Smoky Mountains National Park); Virginia (East Falls Church, Galax, Meadows of Dan, and near Plummers Island in Maryland);

Washington (Mount Rainier at 4,700 ft.); West Virginia (Bolivar and Lost River State Park); and Wisconsin (Door Co. and Madison).

The species is adult from mid-spring to early fall. Adults are particularly common in July and August.

Seasonal records earlier than May 15 and later than September 15 are: April 26 at Bowie, Md.; April 28 in Virginia near Plummers Island, Md.; April 29 at Meadows of Dan, Va., and at Big Walnut Creek near Columbus, Ohio; May 2 and 10 at Swarthmore, Pa.; May 5 in Lake County, Mich.; May 6 at Cabin John, Md.; May 9, 10, and 12 at Ithaca, N. Y.; May 10 in Hocking County, Ohio; September 16 at Puritas Springs, Ohio; September 20 and 24 at Bolivar, W. Va.; and September 24 and October 13 at Takoma Park, Md.

Reared specimens are as follows: ♀, from "*Cacoecia*," Ithaca, N. Y., July 10, 1904. ♂, from pupa of microlepidoptera on *Ostrya*, Bobcaygeon, Ont., July 3, 1931, J. McDunnough. ♂, from *Archips rileyana*, C. V. Riley collection. ♂, ♀, from *A. rileyana*, Black Mts., N. C., W. D. Kearfott. 2♂, from *A. cerasivorana*, Wallingford, Conn., 1917, B. A. Porter. ♂, ♀, from *A. cerasivorana*, Amherst, Mass., July 16, 1909. ♀, from *A. cerasivorana*, New Haven, Conn., July 7, 1943, J. V. Schaffner. ♂, from *A. cerasivorana*, Wallwest, Sask., Aug. 9, 1945. 6♂, from *A. cerasivorana*, Prince Albert, Sask., July 29, 1939 and Aug. 2, 1939. 2♂, from *A. cerasivorana*, Point Pelee, Ont., July 9 and 16, 1940. ♂, from *A. cerasivorana*, Widdifield Township, Ont., July 27, 1940. ♂, from *A. cerasivorana*, St. Andrews, N. B., Aug. 1. 6♀, from *A. cerasivorana*, Whitemouth, Man., Aug. 5, 9, and 11, 1938. ♀, from *A. cerasivorana*, St. Davids, Ont., June 26, 1932, Wm. L. Putman. 6♂, 1♀, from *A. cerasivorana*, Camlachie, Ont., July 11, 1951. 5♀, from *A. cerasivorana*, Grimsby, Ont., July 14, 15, 16, and 18, 1938, W. L. Putman. 2♂, from *A. fervidana*, Norway Bay, Que., July 12, 1938, E. G. Lester. ♂, from *A. fervidana*, Chalk River, Ont., July 24, 1939. ♀, from *A. fervidana*, Hillsdale, Ont., July 28, 1939. ♂, from "*Tortrix*" on *Alnus*, possibly *T. myricana*, Bobcaygeon, Ont., July 1932, J. McDunnough. ♂, from microlepidopteran on *Carya*, Bobcaygeon, Ont., July 7, 1931, J. McDunnough. ♂, from *A. rosaceana*, Miller Lake, Ont., July 11, 1951. ♂, from *A. rosaceana*, "Overs Bay," Ont., July 10, 1951. ♂, from leaf roller, Lansing, Mich., July 2, 1885, H. J. Cook. ♀, from "*Tortrix*" on *Abies*, Dennysville, Maine, June 28, 1946. ♂, from *Argyrotaenia lutosana*, Opasatika, Ont., 1939. ♂, from *A. lutosana*, Rouyn, Que., 1939. ♀, from *A. lutosana*, Clova, Que., 1938.

In our own collecting we have found the species common around bushes on the edges of woods. When captured it gives off a strong odor like that of species of *Coccygomimus*.

This species is transcontinental, mostly in the Transition and Upper Austral zones. Adults occur around deciduous trees and bushes and are on the wing from mid-spring to early fall. In collections, it is the commonest Nearctic species of the genus.

27. Exochus rutilatus, new species

FIGURES 189,n; 193,h

Front wing 5.2 to 6.2 mm. long; combined face and clypeus about 1.36 as high as wide, in a vertical direction moderately and evenly convex but with the clypeus weakly bulging, in a horizontal direction with the same convexity as vertically; punctures of face very coarse, strong, separated by about 0.3 their diameter; punctures on clypeus a little sparser than those on face; apical angle of interantennal process about 100 degrees; median swelling of frons weak but rather distinctly delimited; hind ocellus separated from eye by about 0.72 its long diameter in male, by about 0.65 its long diameter in female; median half of clypeal margin truncate or weakly concave; mandible with coarse, rather sparse punctures, basally rather broad, evenly tapered to a moderately narrow apex, its lower tooth small; costula represented by short stubs, rarely subcomplete; second lateral area of propodeum with a few hairs basally and usually apicolaterally, the rest bare; areola bounded laterally by broad, flat, strong carinae; hind femur about 2.31 as long as deep in male, about 2.21 as long as deep in female; front spur of hind tibia about 3.3 as long as wide in male, about 3.5 as long as wide in female; punctures on second abdominal tergite of moderate size, deep, medially very sparse or absent, sublaterally separated by about 1.5 their diameter; male clasper broad, with dense hairs, obliquely narrowed from below to a narrowly rounded apex.

Black. Face, usually narrow orbits on lower half of frons, large spot at top of eye, cheek, adjacent temple, clypeus, mouth parts,

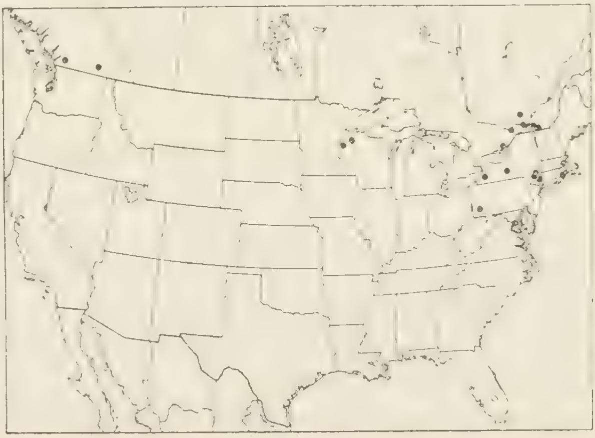


FIGURE 133.—Localities for *Exochus rutilatus*.

under side of scape, lower 0.6 of propleurum of male, large hind corner of pronotum (extending forward more than half its length), sides and apex of scutellum, and postscutellum, ivory white; flagellum tinged with brown beneath; tegula ivory white, subapically fulvous; lower part of female propleurum tinged with fulvous; thoracic sterna fulvous, the mesosternum tinged with ivory, especially in male; mesopleurum fulvous, its subtegular ridge and a spot or tinge on upper part of prepectus ivory white and with a blackish transverse band just below subtegular ridge; disc of scutellum fulvous to black; metapleurum fulvous; pleural areas of propodeum more or less fulvous; coxae fulvous, the front and middle coxae apically whitish; trochanters pale fulvous tinged with ivory; femora fulvous, apically ivory; front and middle tibiae ivory on the basal 0.45±, the rest fulvous or in the case of the middle tibia weakly infuscate; front and middle tarsi stramineous, the fifth segment of middle tarsus mostly fuscous; hind tibia and tarsus whitish, the basal 0.22± and apical 0.36± of the tibia and most of the fifth tarsal segment blackish.

Type: ♀, Six Mile Creek, Ithaca, N. Y., July 26, 1939, P. P. Babiy (Washington, USNM 63660).

Paratypes (18♂, 20♀): From British Columbia (Hope and Robson); Maryland (Takoma Park); Massachusetts (Holliston); New York (Bemus Point, Greene Co., Ithaca, Poughkeepsie, and Shokan); North Carolina (Wake Co.); Nova Scotia (Baddeck Forks); Ontario (Bells Corners, Gananoque, and "Merivale"); Pennsylvania (Pittsburgh); Prince Edward Island (Brackley Beach in Canadian National Park and Dalvey House in Canadian National Park); Quebec (Lac Mercier, La Trappe, St. Hilaire, and Sweetsburg); Rhode Island (Westerly); and Wisconsin (Polk Co. and Sawyer Co.).

Collection dates are rather evenly distributed from June 23 to August 18.

Our own collections and the general distribution of the species indicate that its habitat is moist deciduous woods.

This species is transcontinental in moist deciduous woods, in the Transition and Upper Austral zones. Adults are mostly in July and early August.

28. Exochus armillosus, new species

FIGURES 189,o; 193,i

Front wing 5.3 to 6.0 mm. long; combined face and clypeus about 1.06 as high as wide, the face rather strongly convex in a vertical direction, a little less strongly convex horizontally; clypeus of female in profile distinctly flattened, of male weakly bulging; punctures on face and clypeus strong, moderately coarse, on face subadjacent, on clypeus rather sparse; apical angle of interantennal process about 95

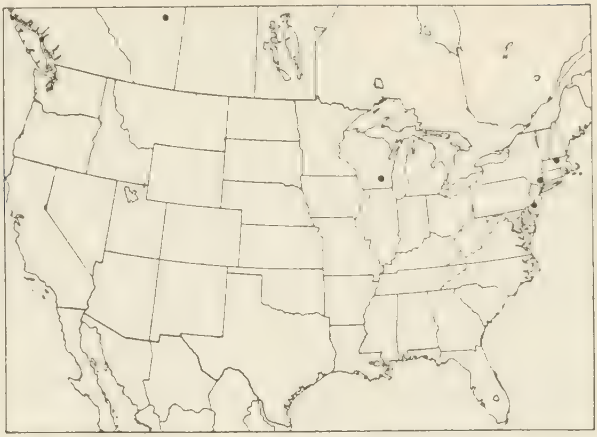


FIGURE 134.—Localities for *Exochus armillosus.*

degrees; median swelling of frons strong; hind ocellus separated from eye by about 0.65 its long diameter in male, by about 1.1 its long diameter in female; median half of apical margin of clypeus weakly concave; mandible with sparse, rather coarse punctures, rather broad at base, evenly tapered to a rather broad apex, its lower tooth small; costula represented by stubs; second lateral area of propodeum with hairs basally, apicolaterally, and often a few in other areas; areola bounded laterally by broad, flat, strong carinae; hind femur about 2.15 as long as deep in male, about 1.95 as long as deep in female; front spur of hind tibia about 3.1 as long as wide; punctures on second abdominal tergite sharp, sparse or absent medially, sublaterally of medium size and separated by about 1.5 their diameter in male, of small size and separated by about 2.3 their diameter in female; male clasper broad, with dense hairs, obliquely narrowed from below to a rather narrowly rounded apex.

Colored like *Exochus rutilatus* with the following differences: Whitish mark on pronotum averaging a little longer; apical 0.40± of hind tibia blackish; apex of first four segments of hind tarsus blackish; female usually with a median vertical mark on face and spot next to the clypeal fovea brownish. The whitish mark covering the cheek in the female does not extend on to the temple.

Type: ♀, Moorestown, N. J., July 16, 1939, H. and M. Townes (Washington, USNM 63661).

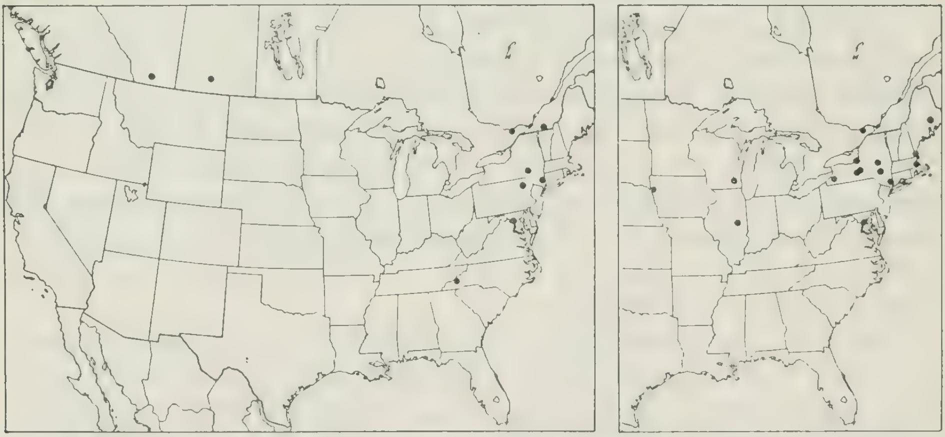
Paratypes: ♂, Edmonton, Alta., Aug. 29, 1947, E. H. Strickland (Townes). ♀, Petersham, Mass., July 1940, C. T. Brues (Cambridge). ♂, ♀, Moorestown, N. J., July 26 and August 6, 1939, H. and M. Townes (Townes). ♂, ♀, Poughkeepsie, N. Y., Aug. 2 and 23, 1936, H. Townes (Townes). ♂, Alberton, Prince Edward Isl., July 17, 1940, G. S. Walley (Ottawa). ♂, Madison, Wis., July 8, 1929, C. L. Fluke (Madison).

Our collections were from deciduous woods.

29. Exochus brutus, new species

Figures 189,p; 194,a

Front wing 4.9 to 7.5 mm. long; combined face and clypeus about 1.02 as high as wide, the face rather strongly convex in a vertical direction, a little less strongly convex horizontally; clypeus of female in profile distinctly flattened, of male weakly bulging; punctures on face and clypeus strong, moderately coarse, on face subadjacent, on clypeus sparse; apical angle of interantennal process about 110°; median swelling of frons moderately strong; hind ocellus separated from eye by about 0.90 its long diameter in male, by about 1.0 its long diameter in female; median half of apical margin of clypeus weakly concave; mandible with sparse, rather coarse punctures, rather broad and its apex unusually broad, its outer face and lower edge more convex than usual, its lower tooth small; costula complete or incomplete; second lateral area of propodeum with hairs all over in many males, but in females and in some males with hairs only basally, laterally, and apicolaterally; areola bounded laterally by strong, low, moderately wide carinae; hind femur about 2.31 as long as deep in male, about 2.12 as long as deep in female; front spur of hind tibia about 3.4 as long as wide in male, about 3.65 as long as wide in female; punctures on second abdominal tergite of moderate size, deep, medially sparse or absent, sublaterally separated by about 1.3 their diameter in male, by about 1.7 their diameter in female; male clasper rather broad, obliquely narrowed from below to a narrowly rounded apex.



Figures 135, 136.—Localities: 135 (left), *Exochus brutus;* 136 (right), *E. virgatifrons.*

Colored like *Exochus rutilatus* except for the following differences: Whitish mark on pronotum averaging a little longer; apical 0.42± of hind tibia blackish; apex of first four segments of hind tarsus sometimes stramineous; female with a median vertical mark on face and a spot next the clypeal fovea brown. The whitish mark covering the cheek in the female does not extend on to the temple.

Type: ♀, Poughkeepsie, N. Y., July 15, 1936, H. Townes (Washington, USNM 63662).

Paratypes: ♂, Chin, Alta., Aug. 19, 1929, G. F. Manson (Ottawa). ♂, Plummers Island, Md., July 20, 1913, W. D. Appel (Washington). ♂, Milford Center, N. Y., July 13, 1935, H. Townes (Townes). ♀, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Townes). ♂, Lake Junaluska, N. C., June 6, 1956, H. V. Weems, Jr. (Townes). ♀, Jockvale, Ont., July 4, 1934, W. J. Brown (Ottawa). ♂, Spring Brook, Pa., June 28, 1945, H. Townes (Townes). ♂, reared from phycitid on *Tilia*, Knowlton, Que., 1930, J. McDunnough (Ottawa). ♀, Mossbank, Sask., July 10, 1923, Kenneth M. King (Ottawa).

This is a species of the Alleghenian fauna.

30. Exochus virgatifrons, new species

FIGURES 189,q; 194,b

Front wing 4.9 to 6.0 mm. long; combined face and clypeus about 1.18 as high as wide, moderately convex both horizontally and vertically, in profile faintly flattened just above clypeus and the apical part of clypeus more strongly incurved, their punctures coarse and strong, subadjacent on face, sparse on clypeus; apical angle of interantennal process about 105 degrees; median swelling of frons weak, laterally only indistinctly differentiated; hind ocellus separated from eye by about 0.45 its long diameter in both sexes; median half of apical margin of clypeus weakly concave; mandible with sparse, moderate-sized punctures, evenly tapered from its base of moderate width to its rather narrow apex, its lower tooth small; costula represented by short stubs; second lateral area of propodeum with a few hairs basally and often a very few apicolaterally, the rest bare; areola bounded laterally by weak or obsolescent carinae; hind femur about 2.60 as long as deep in male, about 2.40 as long as deep in female; front spur of hind tibia about 3.3 as long as wide in male, about 3.4 as long as wide in female; punctures of second abdominal tergite of moderate size, strong, sublaterally separated by about 1.3 their diameter, medially absent or very sparse.

Colored in general like *Exochus rutilatus* except that the pale markings are a little more extensive. The following are definite points of difference: Frons always with a complete and rather broad ivory orbital border that is confluent with ivory mark at top of eye; ivory mark on upper hind part of pronotum extending forward to about the epomia; pronotum sometimes largely pale; disc of scutellum always fulvous; mesoscutum often more or less fulvous; and hind tibia blackish on its basal 0.18± and apical 0.28±.

Type: ♀, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Washington, USNM 63663).

Paratypes: ♂, New Haven, Conn. (Washington). ♀, Sioux City, Iowa, July 31, 1928, C. N. Ainslee (Washington). 2♀, Mahomet, Ill., June 29, 1930, A. R. Park (Washington). ♀, Bangor, Maine, F. A. Eddy (Cambridge). ♀, Takoma Park, Md., June 3, 1944, H. and M. Townes (Townes). ♀, Wollaston, Mass., Aug. 15, 1896, F. H. Sprague (Cambridge). ♀, Hampton, N. H., July 24, 1914, S. Albert Shaw (Washington). ♀, Bemus Point, N. Y., Aug. 21, 1937, H.Townes (Townes). ♀, Canajoharie, N. Y., Aug. 4, 1934, H. Townes (Townes). ♀, Ithaca, N. Y., Aug. 10, 1947 (Ottawa). ♂, McLean Reserve in Tompkins Co., N. Y., Aug. 14, 1947 (Ottawa). ♂, Oswego, N. Y., June 16, 1896 (Washington). ♂, ♀, Poughkeepsie, N. Y., July 18, 1936, H. Townes (Townes). ♂, Prattsville, N. Y., Aug. 8, 1934, H. Townes (Townes). ♀, reared from *Canarsia ulmiarrosorella*, Ottawa, Ont., 1949 (Ottawa). ♂, Dow's Swamp, Ottawa, Ont., July 17, 1946, G. S. Walley (Ottawa). ♂, Jefferson Co., Wis., July 22, 1945, W. McNeel (Madison).

This is a species of the Alleghenian fauna. Adults have been collected from June 16 to August 21.

31. Exochus ferrugineus Ashmead

FIGURES 189,r; 194,c

Amesolytus ferrugineus Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 201; ♂, ♀. Lectotype hereby designated: ♀ (both front wings off, one of them pasted on locality label), Texas, Belfrage collection (Washington).

Front wing 4.4 to 6.3 mm. long; combined face and clypeus about 1.18 as high as wide in male, about 1.25 as high as wide in female, moderately, evenly convex in both vertical and horizontal directions, their punctures rather coarse and strong, subadjacent on face, sparse on clypeus; apical angle of interantennal process about 90 degrees; median swelling of frons weak, laterally only indistinctly differentiated; hind ocellus separated from eye by about 0.45 its long diameter in male, by about 0.25 its long diameter in female; median half of apical edge of clypeus weakly concave; mandible with sparse, moderate-sized punctures, evenly tapered from its base of moderate width to its moderately narrow apex, its lower tooth small; costula usually incomplete; second lateral area of propodeum with a very few hairs, these at its base and/or in its apicolateral corner; areola bounded laterally by weak or obsolescent carinae; hind femur about 2.36 as long as deep in male, about 2.55 as long as deep in female; front spur of hind tibia about 3.5 as long as wide in male, about 3.6 as long as wide in female; punctures of second abdominal tergite of moderate size and strength, sublaterally separated by about 1.3 their diameter, medially absent or very sparse.

Head ivory white, a pair of small spots medially on lower part of frons and a spot enclosing ocelli and upper half of occiput fulvous to blackish brown, the occipital mark connecting laterally with hind margin of eye and medially with spot enclosing ocelli; mouth parts white; antenna blackish brown, brown below, the underside of scape white; thorax fulvous, the upper part of pronotum (broad behind and tapering forward to epomia), most of propleurum in male, tegula, subtegular ridge, apex and sides of scutellum, postscutellum, mesosternum more or less and more or less of prepectus, ivory white; front and middle legs whitish, partly tinged with fulvous; hind coxa fulvous; hind trochanters pale fulvous; hind femur fulvous, its apex white; hind tibia white, its basal 0.20± and apical 0.30± blackish; hind tarsus white, its last segment fuscous except at base; abdomen fulvous or sometimes partly or entirely infuscate. Rarely the upper part of propodeum and areas on thorax surrounding wing bases are infuscate.

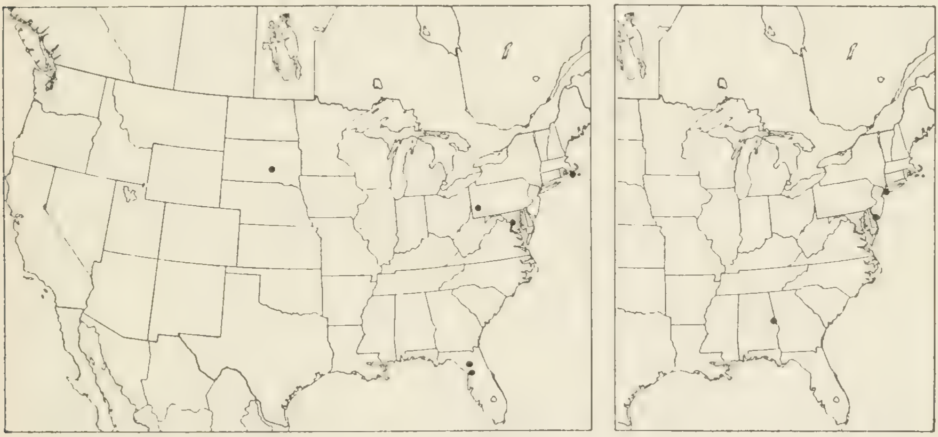


FIGURE 137, 138—Localities: 137 (left), *Exochus ferrugineus;* 138 (right), *E. mesorufus.*

This is a distinctive species in its fulvous ground color, enlarged ocelli, frons largely white, weak median swelling on frons, and weak median carinae on propodeum. It is approached, however, or almost matched in all of these characters by the closely related *Exochus virgatifrons*. *E. ferrugineus* shows an interesting reversal of the usual sexual differences in having the female ocelli larger than those of the male and the female hind femur more slender than that of the male.

Specimens: ♂, 2 miles west of Archer, Fla., Mar. 25, 1953, H. F.

Howden (Townes). ♂, 4 miles northwest of Dunnellon, Fla., Aug. 3, 1938, Hubbell and Friauf (Ann Arbor). ♀, Iowa, Aug. 21, 1935, H. E. Jacques (Washington). ♂, Takoma Park, Md., July 6, 1944, H. Townes (Washington). ♂, Martha's Vineyard, Mass., F. M. Jones (Townes). ♀, Allegheny Co., Pa., June (Pittsburgh). ♀, Allegheny Co., Pa., "Aug. 8–14," H. Kahl (Pittsburgh). ♀, in light trap, Fort Thompson, S. Dak., Aug. 12, 1943, D. T. Murdock (Townes). ♀ (type), Texas (Washington). ♀, G. W. Belfrage (Townes). ♀, Aug. 19, 1892 (Washington).

This species is widely distributed from Pennsylvania to Florida, west to South Dakota and Texas, but is scarce in collections. The pale color, large ocelli of the female and the fact that one female was caught in a light trap indicate that this sex at least may fly at night.

32. Exochus mesorufus, new species

Figures 189,s; 194,d

Front wing 3.8 to 4.9 mm. long; combined face and clypeus about 1.18 as high as wide in male, about 1.15 as high as wide in female, moderately and evenly convex in the vertical and horizontal planes except that the clypeus in profile bulges weakly; punctures of face and clypeus moderate in size and strength, on face separated by about 0.5 their diameter, on clypeus much sparser; apical angle of interantennal process about 100 degrees; median swelling of frons weak, laterally not differentiated; hind ocellus separated from margin of eye by about 0.75 its long diameter in male, by about 0.95 its long diameter in female; median half of apical margin of clypeus truncate or faintly concave; mandible broad, with small, rather sparse punctures, rather evenly tapered to its moderately broad apex, its lower tooth small; costula incomplete or medially weak; second lateral area of propodeum with a very few hairs basally or laterally; areola bounded laterally by rather weak and narrow carinae; hind femur about 2.40 as long as deep in male, about 2.17 as long as deep in female; front spur of hind tibia about 3.1 as long as wide in male, about 3.2 as long as wide in female; punctures of second abdominal tergite small, not deep, medially absent or very sparse, sublaterally separated by about twice their diameter.

Male: Black. Face, narrow orbital line on lower half of frons, triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, lower 0.3 of propleurum, upper margin of pronotum from epomia to apex (widened posteriorly), lower corner of pronotum, tegula, subtegular ridge, narrow apex and sides of scutellum, narrow transverse mark on postscutellum, upper part of prepectus, mesopleurum narrowly next to its coxa, and front and middle legs, ivory white; antenna blackish brown, brown below, the under side of scape white; mesosternum except for its median groove and mesopleurum except dorsally and dorsoposteriorly, fulvoferruginous; hind coxa, trochanters, and femur fulvous, the femur white at apex; hind tibia white, its basal and apical 0.20 fuscous, the apical fuscous mark prolonged basad on the ventral and exteroventral sides; hind tarsus white, the last segment fuscous except at its base.

Female: Black. Face, triangular spot at top of eye, cheek, clypeus, mouth parts, upper margin of pronotum from epomia to apex (widened posteriorly), tegula, subtegular ridge, narrow apex and sides of scutellum, and narrow transverse mark on postscutellum, ivory white, the face ventrally and medially usually more or less brown and the apex of mandible light brown; antenna brown, paler below, the under side of scape ivory; disc of scutellum and often more or less of mesoscutum fulvoferruginous; mesopleurum fulvoferruginous on its upper anterior swelling, this color often more extended to cover much of mesopleurum and mesosternum; metapleurum sometimes partly fulvoferruginous; front and middle legs fulvous, their coxae and femora apically and much of their tibiae basally and externally, yellowish white; hind coxa, trochanters, and femur fulvous, the apex of femur yellowish white above; hind tibia white, its basal 0.18± and apical 0.25± fuscous, the fuscous apical mark prolonged basad on its exteroventral side to its basal 0.45±; hind tibia white, its last segment fuscous apically.

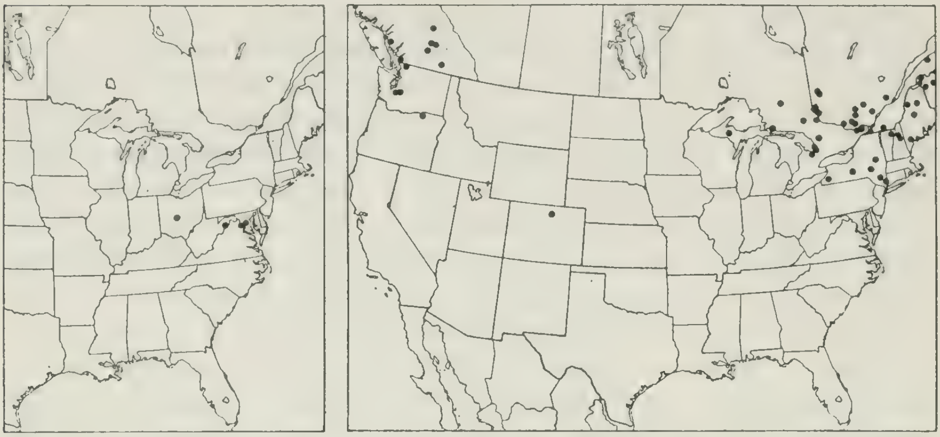
Type: ♀, Ship John Light House, Delaware Bay, May 24, 1936 (Washington, USNM 63664).

Paratypes: ♀, Langdale, Ala., H. H. Smith (Washington). ♂, 2♀, Pokemouche, N. B., July 8, 1940, G. S. Walley (Ottawa). ♀, Rockaway, Long Island, N. Y. (New York). ♀, no data (Ottawa).

33. Exochus genualis, new species

Figures 189,t; 194,e

Male: Front wing 3.7 to 4.3 mm. long; combined face and clypeus about 1.16 as high as wide, moderately and evenly convex in both vertical and horizontal directions except that the clypeus is faintly bulging, their punctures of moderate size, separated by about 0.5 their diameter on face, sparser on clypeus; apical angle of interantennal process about 90 degrees; median swelling of frons very weak, laterally not differentiated; hind ocellus separated from eye by about 0.87 its long diameter; temple unusually swollen and convex; median half of clypeal margin truncate; mandible with moderately small punctures, moderately wide basally, evenly tapered to its moderately narrow apex, its lower tooth small; costula represented by short stubs; second lateral area of propodeum with a few hairs basally and apicolaterally, the rest bare; areola bounded laterally by weak carinae; hind femur about 2.35 as long as deep; front spur of hind tibia about 3.8 as long as wide; punctures on second abdominal tergite very small, weak, medially sparse or absent, sublaterally separated by about 2.5 their diameter; clasper rather broad, moderately hairy, tapered obliquely from below to a rather sharp apex.



FIGURES 139, 140.—Localities: 139 (left), *Exochus genualis;* 140 (right), *E. peroniae.*

Black. Face, narrow orbits on lower 0.5 to 0.7 of frons, large triangular spot at top of eye, cheek, lower 0.3 to 0.5 of temple, mouth parts, lower third of propleurum, upper part of pronotum (more broadly posteriorly), lower corner and sometimes narrow hind margin of pronotum, tegula, subtegular ridge, apex and sides of scutellum, postscutellum, lateral portion of prepectus, sometimes anterodorsal swollen part of mesopleurum, areas along lower edge of mesopleurum, sometimes much of mesosternum, and front and middle legs, ivory white; antenna blackish brown, paler below, its scape and pedicel ivory white below; mesosternum except on median line and where white, most or all mesopleurum except under subtegular ridge and where white, often mesonotum and metapleurum except around edges, and disc of scutellum, fulvous; hind leg ivory white, the basal 0.17± of tibia blackish and sometimes the apical 0.17± of tibia partly infuscate.

Female: Unknown.

Type: ♂, "Blood Mt," Ga., May 16, 1951, P. W. Fattig (Washington, USNM 63665).

Paratypes: ♂, Takoma Park, Md., May 24, 1942, H. and M. Townes (Townes). ♂, Ramsey, N. J., June 22, 1917 (New York). ♂, Columbus, Ohio, J. O. Pepper (Washington). ♂, Falls Church, Va., May 15, N. Banks (Cambridge). ♂, Lost River State Park, Hardy Co., W. Va., June 21, 1951, K. V. Krombein (Townes).

34. Exochus peroniae, new species

FIGURES 189,u; 194,f

Front wing 3.3 to 5.8 mm. long; combined face and clypeus about 1.15 as high as wide, their vertical convexity uniform and moderately strong, their transverse convexity stronger than the vertical, their punctures moderately coarse, separated by about 0.3 their diameter on the face, much sparser on the clypeus; interantennal process with an apical angle of about 100 degrees; frons with rather strong oblique impressions, between which it is rather strongly swollen; median 0.4 of clypeus truncate; mandible broad basally, with sparse coarse punctures, rather evenly tapered to a moderately broad apex, its lower tooth very small; hind ocellus separated from eye by about 0.88 its long diameter in male, by about 1.0 its long diameter in female; costula weak and broadly interrupted medially; second lateral area of propodeum with a few hairs basally and apicolaterally, or in some males more extensively hairy; hind femur about 2.25 as long as deep in male, about 1.90 as long as deep in female; front spur of hind tibia about 3.2 as long as wide; punctures on second abdominal tergite of moderate size, sharp, usually sparse or almost absent medially, sublaterally separated by about 2.5 their diameter; male clasper exceptionally narrow.

Black. Face, narrow orbital line on lower half of frons, elongate triangle at top of eye, cheek, adjacent part of temple, mouth parts, under side of scape and pedicel, lower margin of propleurum of male, elongate hind corner of pronotum, tegula, subtegular ridge, vertical elliptical spot on upper part of male prepectus, hind margin of scutellum, postscutellum, and in most males a spot on mesosternum in front of middle coxa, pale yellow; flagellum brown beneath, the rest blackish brown; mesopleurum and metapleurum next to their coxae narrowly pale yellow or fulvous; front and middle coxae pale yellowish, fulvous basally, or in females often almost entirely fulvous; hind coxa fulvous; trochanters pale yellow to fulvous; front and middle femora pale fulvous, pale yellow apically; hind femur fulvous, tinged with pale yellow apically above, front and middle tibiae yellowish white on basal 0.45 ±, the rest fulvous, in the female sometimes weakly infuscate, especially on middle tibia; front and middle tarsi stramineous, darker apically; hind tibia whitish, its basal 0.14 ± and apical 0.4 ± fuscous; hind tarsus whitish, the apex of the first to fourth segments and apical 0.7 ± of fifth segment light brown to fuscous.

Type: ♀, Ashford, Wash., Aug. 18, 1940, H. and M. Townes (Washington, USNM 63666).

Paratypes (47♂, 63♀): From British Columbia (Barriere, Edgewood, Fish Lake Road at Kamloops, near Foreman, Fish Trap in

Nehalliston Forest, Powell River in Paradise Valley, Upper Clearwater River, and Vancouver); Colorado (Glen Haven); Maine (Casco, "Dead River," Greenville, Holeb, and Millinockett); Michigan (Dickinson Co.); New Brunswick (Charlotte Co., Dawson Siding, Gloucester Co., Madawaska Co., Northumberland Co., Restigauche Co., and Victoria Co.); New Hampshire (Pinkham Notch and Randolph); New York (Lake Sebago in Bear Mountain Park, Bemus Point, Canajoharie, Ithaca, Oneonta, and Shokan); Nova Scotia (Halifax Co.); Ontario (Bear Lake, Bells Corners, Biscotasing, Elk Lake, Grand Bend, Hillsdale, Lisle, "Masser," Mer Bleue (near Ottawa), Port McNicoll, Sudbury, and Thessalon); Oregon (Meacham); Quebec (Angliers, Bonaventure Co., Brome, Covey Hill, East Aldfield, Fort Coulange, Gracefield, Labelle, Lorrainville, Matane Co., Matapedia Co., Noranda, Rouyn, St. Ann de la Perade, St. Gabriel de Brandon, and Stoneham); Vermont (Willoughby); and Washington (Ashford, Glacier, and Mount Rainier at 4,000 ft.).

The majority of specimens were collected or reared between July 10 and August 10, but dates of capture range through the summer. Particularly early and late seasonal dates are: May 28 at Old Chelsea, Que.; June 2 at Ithaca, N. Y.; June 6 at Covey Hill, Que.; June 12 at Greenville, Maine; June 21 at Stoneham, Que.; August 30 at Meacham, Oreg.; September 1 in Halifax County, N. S.; and September 4 at Fish Trap, Nehalliston Forest, B. C.

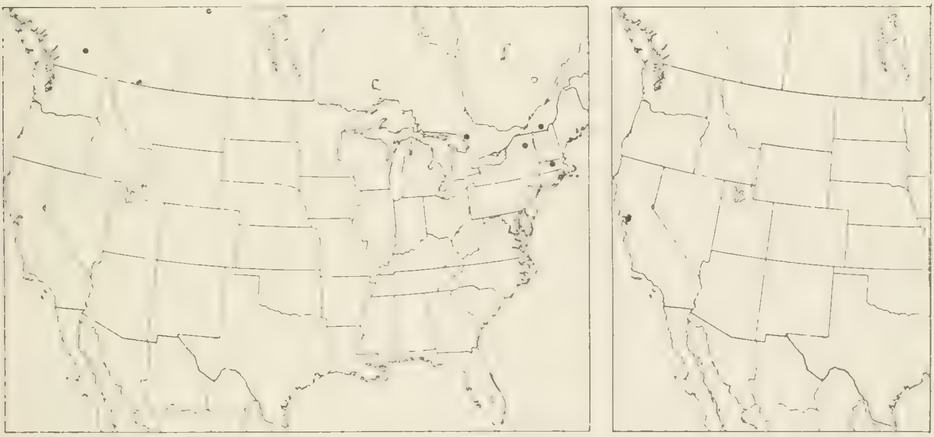
It has been reared many times from *Acleris variana*, in British Columbia (Edgewood, Fish Lake Road at Kamloops, near Foreman, Upper Clearwater River, and Vancouver); New Brunswick (Charlotte Co., Dawson Siding, Gloucester Co., Madawaska Co., Northumberland Co., Restigauche Co., and Victoria Co.); Nova Scotia (Halifax Co.); Ontario (Bear Lake, Biscotasing, Elk Lake, Hillsdale, Lisle, Masser, Port McNicoll, Sudbury, and Thessalon); and Quebec (Angliers, Bonaventure Co., East Oldfield, Fort Coulange, Labelle, Lorrainville, Matane Co., Matapedia Co., Noranda, Rouyn, and St. Gabriel de Brandon). It has also been reared from a few other hosts as follows: ♂, from *Tortrix packardiana*, beaten from *Abies*, June 26, 1946, parasite emerged July 29, 1946; ♀, from *Argyrotaenia*?, beaten from *Abies*, May 29, 1946, parasite emerged June 12, 1946; ♀, from *Archips melaleucana*, Old Chelsea, Que., May 28, 1934; ♀, from cocoon of Neuroptera, Powell River, Paradise Valley, B. C., Aug. 16, 1939, G. F. Smarge. A female is recorded as "flying about *Picea*" at Bells Corners, Ont., June 25, 1935, by G. S. Walley.

This species is transcontinental in the Transition and Canadian zones. Most adults occur in mid-summer. *Acleris variana* and other tortricids on conifers serve as hosts.

35. Exochus cnemidotus, new species

Figures 190,a; 194,g

Front wing 4.2 to 5.6 mm. long; combined face and clypeus about 1.05 as high as wide in male, about 1.13 as high as wide in female, their vertical convexity uniform and moderately strong, their transverse convexity stronger than the vertical, their punctures moderately coarse, separated by about 0.4 their diameter on face, much sparser on clypeus; interantennal process with an apical angle of about 70 degrees; median swelling of frons rather weak; median half of clypeus truncate or weakly concave; mandible broad basally, with sparse coarse punctures, rather evenly tapered to a moderately broad apex, its lower tooth very small; hind ocellus separated from eye by about 0.72 its long diameter in male, by about 1.0 its long diameter in female; costula complete but medially weak; second lateral area of propodeum with a few hairs, these variously distributed along its basal and lateral edges and its lateroapical corner; hind femur about 2.25 as long as deep in male, about 2.07 as long as deep in female; front spur of hind tibia about 2.9 as long as wide in male, about 3.1 as long as wide in female; punctures on second tergite of moderate size, rather sharp, medially very sparse or absent, sublaterally separated by about 1.0 their diameter; male clasper very broad, its apex obliquely subtruncate with the corners rounded.



Figures 141, 142.—Localities: 141 (left), *Exochus cnemidotus;* 142 (right), *E. capnodes.*

Black. Face, narrow orbital line on lower third of frons, elongate triangle at top of eye, and clypeus, whitish, a median vertical line or elliptical spot on face light brown to blackish, often a brown spot outside of clypeal fovea, apical edge of clypeus blackish, and edges of mandible brown or blackish. In the two male specimens at hand the face has across its lower part a broad brown band which extends dorsally along the median line. Cheek more or less, under side of scape, hind corner of pronotum, and obscure mark on subtegular ridge, whitish; flagellum blackish brown, paler, below; basal half of tegula whitish, the rest fulvous; front and middle legs fulvous, their trochanters, coxae, and femora at apex, and basal part of their tibiae and tarsi more or less tinged or marked with pale yellow; hind coxa, trochanters, and femur fulvous; hind tibia white, its basal 0.15± and apical 0.63± fuscous; hind tarsus whitish, the apex of the first through fourth segments and apical 0.7± of fifth segment infuscate.

Type: ♀, Prince Albert National Park, Sask., July 19, 1941, J. G. Rempel (Washington, USNM 63667).

Paratypes: ♂, Waterton, Alta., July 17, 1923, H. L. Seamans (Ottawa). ♀, Trinity Valley, B. C., June 20, 1937, H. Leech (Ottawa). ♀, Mount Wachusett, near Princeton, Mass., July 2, 1948, W. T. M. Forbes (Ithaca). ♂, Mount Marcy, N. Y., June 26, J. N. Belkin (Townes). ♀, Waubamick, Ont., June 5, 1915, H. S. Parish (Ithaca). ♀, Magog, Que., May 25, 1936, G. S. Walley (Ottawa). ♀, Charlestown, R. I., July 24, 1937, M. Chapman (Townes). ♀, Dawson, Yukon, July 17, 1949, W. W. Judd (Lawrence).

This species is trancontinental, mostly in the Canadian zone.

36. Exochus externus, new species

FIGURES 179,k; 190,b; 194,h

Female type: Front wing 4.3 mm. long; combined face and clypeus 1.04 as high as wide, in vertical plane rather strongly convex above, less strongly convex below, in horizontal plane rather weakly convex, their punctures moderately large and coarse, on face separated by about 0.6 their diameter, sparser on clypeus; interantennal process of frons somewhat incurved, its apical angle 85 degrees; median swelling of frons rather strong, ventrally elongate and very protuberant, almost reaching interantennal process; hind ocellus separated from eye by 1.00 its long diameter; median half of clypeal margin faintly concave; mandible with scattered, rather small punctures, broad basally, tapered to a moderately narrow apex, its lower tooth small; costula represented by very short stubs; second lateral area of propodeum with a few hairs basally and in its apicolateral corner; hind femur 2.10 as long as deep; front spur of hind tibia 2.75 as long as wide; punctures of second abdominal tergite very small, rather evenly distributed, their interspaces about 2.5 their diameter.

Black. Face with a vertical yellowish triangle just laterad of each antennal socket; spot at top of eye pale yellow; mouth parts stramineous; hind corner of pronotum pale yellow shading into fulvous forward, the pale hind part of pronotum reaching about 0.6 the distance to epomia; tegula pale yellow, its apical half fulvous; subtegular ridge pale yellow; postscutellum and apex of scutellum fulvous yellow; mesopleurum, metapleurum, hind half of mesoscutum, and scutellum ferruginous, the metapleurum under base of hind wing and mesoscutum laterally black; coxae fulvous, the front and middle coxae pale yellowish apically; trochanters fulvous, the front first trochanter pale yellowish above; femora fulvous, the apex of front and middle femora and a tinge on apex of hind femur above, pale yellow; front and middle tibiae and tarsi light fulvous, the tibiae pale yellowish basally; hind tibia with a white stripe covering its dorsal face from almost the extreme base to almost the extreme apex, brownish next to the white stripe, elsewhere fulvous; hind tarsus very pale fulvous, the first four tarsal segments light brown at apex, the fifth segment light brown except basally.

Type: ♀, "Summit Prairie," Oreg., July 23, 1939, Schuh and Gray (Corvallis).

37. Exochus capnodes, new species

Figures 179,l; 190,c; 194,i

Male type: Front wing 3.8 mm. long; combined face and clypeus 0.98 as high as wide, rather strongly evenly convex in both vertical and horizontal planes, their punctures moderate sized, moderately strong, on face separated by about 0.5 their diameter, on clypeus a little sparser; interantennal process of type specimen apparently abnormal, with a small, median vertical groove and a small median apical notch, the apical angle about 135 degrees; median swelling of frons moderately strong; hind ocellus separated from eye by about 0.86 its long diameter; median 0.6 of clypeal margin weakly concave; mandible with small sparse punctures, of moderate width, its apex unusually wide and its ventral tooth unusually large, though much smaller than upper tooth; costula incomplete; second lateral area of propodeum with hairs on its lateral third; hind femur 2.30 as long as deep; front spur of hind tibia 2.3 as long as wide; punctures on second abdominal tergite moderately small, not strong, the sublateral ones with interspaces about 0.7 their diameter, the median ones somewhat sparser.

Black. Face yellow, brown along its lower margin; no pale spot at top of eye; clypeus dark brown with an indefinite yellowish apicolateral area; mouth parts stramineous; tegular brown with a large basal yellow spot; trochanters and front and middle coxae brown; front femur brown, paler in front, its apex brownish yellow; front tibia and tarsus light brown, yellowish basally; middle femur brown, its apex brownish yellow; middle tibia brownish yellow on basal half, the rest brown; middle tarsus stramineous, brown apically; hind coxa blackish; hind femur blackish brown, its apex yellow above; hind tibia pale brownish yellow, its basal 0.17 and apical 0.33 dark brown, ventrally its apical 0.55 dark brown; hind basitarsus brownish yellow, brown at apex; second and following segments of hind tarsus missing from type.

Type: ♂, Oakland, Calif., Apr. 30, 1939, E. S. Ross (Washington, USNM 63668).

38. Exochus signifer, new species

FIGURES 179,m; 190,d; 195,a

Male: See the note under *E. transversus* "male."

Female: Front wing 4.6 to 5.2 mm. long; combined face and clypeus about 0.91 as high as wide, rather strongly, evenly convex in vertical plane, moderately convex in horizontal plane, their punctures moderately coarse, strong, on face separated by about 0.5 their diameter, on clypeus somewhat sparser; apical angle of interantennal process about 60 degrees; median swelling of frons rather strong and distinct; hind ocellus separated from eye by about 1.00 its long diameter; median half of clypeal margin straight; flagellum with 26 to 28 segments; mandible with moderate-sized scattered punctures, rather long and weakly tapered, its lower tooth small and upper tooth unusually long, costula complete or incomplete; second lateral area of propodeum with a very few hairs laterally; hind femur about 2.12 as long as deep; second abdominal tergite impunctate medially, its punctures sublaterally of moderate size, sharp, and separated by about 1.6 their diameter.

Black. Face, orbital line on lower 0.2 to 0.6 of frons, rather large spot at top of eye, clypeus, cheek, adjacent temple, mouth parts, under side of scape, upper margin of pronotum from epomia to apex

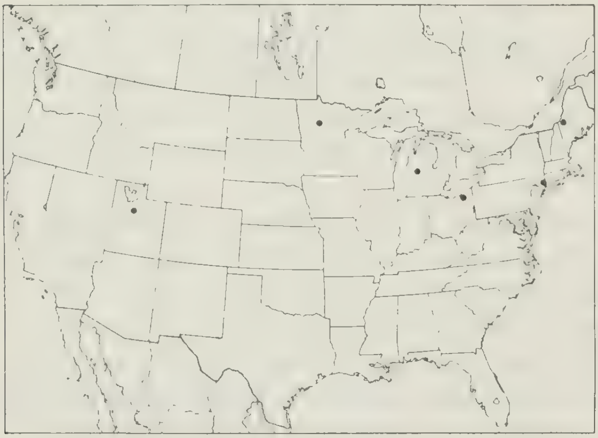


FIGURE 143.—Localities for *Exochus signifer*.

(widening posteriorly), tegula, subtegular ridge, usually narrow apex and basal corner of scutellum, and usually a narrow line on postscutellum, pale yellow, the face usually with a broad, median, subdorsal, triangular blackish area which is sometimes enlarged ventrally to reach clypeus; flagellum blackish brown, brown beneath; pleura next to each coxa and often the scutellum ferruginous, rarely the pleura almost entirely ferruginous; front and middle legs fulvous, their coxae apically, trochanters, femora at apex, and tibiae on basal 0.4, yellowish; hind coxa, trochanters, and femur fulvous, the femur occasionally obscurely yellowish at apex above; hind tibia white, its basal 0.14± and apical 0.35± (measured on dorsal edge), brown or blackish, on its front face the apical blackish area extending about 0.60 the length of the tibia; hind tarsus pale stramineous, its last segment blackish except towards its base.

Type: ♀, Stratton, Maine, Aug. 19, 1945, J. C. Bradley (Washington, USNM 63669).

Paratypes: ♀, College, Alaska, July 16, 1945, J. C. Chamberlin (Washington). ♀, Katmai, Alaska, August 1917, Jas. S. Hine (Townes). ♀, "Kelso," B. C., July 12, J. W. Cockle (Washington). ♀, Mecosta Co., Mich., July 25, 1951, R. R. Dreisbach (Dreisbach). ♀, Itasca State Park, Minn., September, S. Garthside (Washington). ♀, Peekskill, N. Y., July 6, 1941, H. Townes (Townes). ♀, Summit Co., Ohio, Aug. 4, 1936, L. J. Lipovsky (Lawrence). ♀, Goshen, Utah, Aug. 16, 1940, R. H. Beamer (Lawrence). 2♀, "Cranmoor," Wis., Oct. 6, 1909, C. W. Hooker (Townes). ♀, data illegible, H. G. Dyar (Washington).

This species is transcontinental in the Canadian and Transition zones.

39. Exochus transversus, new species

FIGURES 179,n; 190,e; 195,b

Female: Front wing 4.0 to 4.2 mm. long; combined face and clypeus about 0.88 as high as wide, in vertical plane very strongly convex, a little more convex below than above, in horizontal plane moderately convex, their punctures rather coarse and strong, on face separated by about 0.5 their diameter, on clypeus separated by about 0.7 their diameter; apical angle of interantennal process of face about 70 degrees; median swelling on frons strong and sharply delimited; hind ocellus separated from eye by about 1.00 its long diameter; median 0.6 of clypeal margin faintly concave; flagellum of type with 21 segments, of paratype missing; mandible with medium-sized punctures, rather long and narrow, its outer face rather convex and lower tooth small; metapleurum with a few hairs posteriorly and sometimes a very few discally; costula represented by weak, rather long stubs;

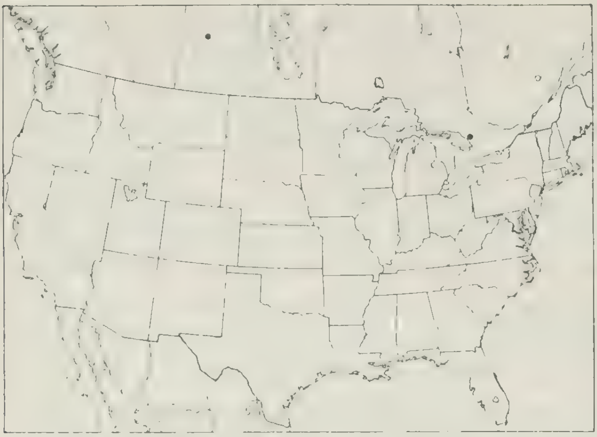


FIGURE 144.—Localities for *Exochus transversus*.

second lateral area of propodeum with a few hairs basally, laterally, and in its apicolateral corner; hind femur about 1.94 as long as deep; front spur of hind tibia about 2.6 as long as wide.

Black. Wide transverse band on upper margin of face, small spot at top of eye, mouth parts, tegula, and narrow hind corner of pronotum, pale yellow, the tegula with a postmedian fulvous area; antenna brown beneath; pleura with a small fulvous-tinged area next to each coxa; front and middle legs fulvous, yellowish on apices of their coxae and femora and on basal half of tibiae; hind coxa, trochanters, and femur fulvous, the femur without an apical yellowish area; hind tibia fulvous below, laterally and above infuscate on its basal 0.19± and apical 0.43±, the rest whitish; hind tarsus pale stramineous, a little darkened apically and on the apex of the first four segments.

Male: A number of males that may belong to this species differ from the females in having the face and clypeus a little less convex and the pale yellow markings much more extensive, including the face, clypeus, cheek, large hind corner of pronotum, prepectus, mesosternum, and other areas. It has not been possible to decide whether these males belong to the present species, to *E. signifer*, or to both species and/or to possibly a third species.

Type: ♀, Saskatoon, Sask., June 22, 1923, N. J. Atkinson (Ottawa).

Paratype: ♀, Waubamick, Ont., June 16, 1915, H. S. Parish (Ithaca).

40. Exochus postfurcalis, new species

FIGURES 190,f; 195,c

Front wing 3.9 to 4.4 mm. long; combined face and clypeus about 1.20 as high as wide in male, about 1.08 as high as wide in female, rather strongly and very evenly convex in both vertical and horizontal planes, their punctures rather small, not strong, on face separated by about 0.7 their diameter, on clypeus a little sparser; apical angle of interantennal process about 105 degrees; median swelling of frons rather strong and sharply delimited; hind ocellus separated from eye by about 0.78 its long diameter in male, by about 0.94 its long diameter in female; median half of clypeal margin straight or in the middle faintly concave; mandible with small, weak, scattered punctures, rather broad, abruptly tapered toward apex, its lower tooth very small; costula absent or represented by short stubs; second lateral area of propodeum usually with a few hairs basally and apicolaterally; nervulus distad of basal vein by about 0.65 its length; hind femur about 2.20 as long as deep in male, about 2.11 as long as deep in female; front spur of hind tibia about 2.0 as long as wide in male, about 2.3 as long as wide in female; second abdominal tergite with medium-sized, sharp punctures, very sparse medially, sublaterally separated by about 2.0 their diameter; male clasper moderately wide, its hairs moderately dense, roundly tapered from below to a sharply rounded apex.

Black. Face, orbital wedge on lower 0.5± of frons, large triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, under side of scape, under side of pedicel of male, lower 0.5± of propleurum of male, very wide hind corner of pronotum tapering forward to about notaulus in male and to about epomia in female, tegula, and subtegular ridge, pale yellow or ivory white; flagellum blackish brown, brown below; propleurum of female largely fulvous; pronotum largely fulvous ventrally and posteriorly; thoracic sterna and pleura varying from all black to all fulvous, usually mostly or entirely fulvous but sometimes entirely black in specimens from more northern localities; prepectus and forward parts of mesosternum and mesopleurum more or less white in male; mesoscutum and scutellum

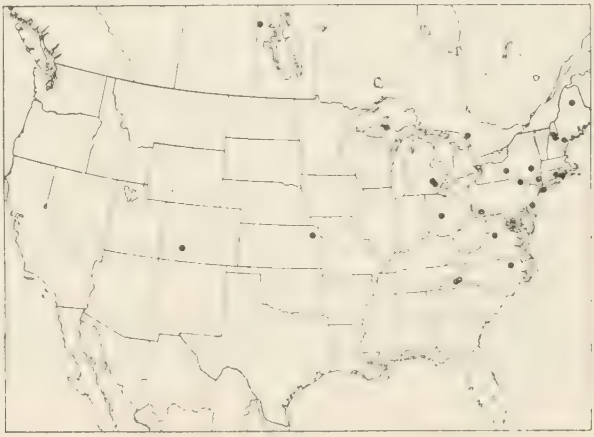


FIGURE 145.—Localities for *Exochus postfurcalis.*

black to fulvous, usually fulvous narrowly bordered with black but sometimes entirely black, especially in specimens from more northern localities; scutellum pale yellowish apically, often yellowish at basal corner and sometimes narrowly yellowish laterally; postscutellum usually marked with fulvous and yellow; pleural areas of propodeum often more or less fulvous; front and middle legs ivory white, the femora except apically and apical half of their tibiae more or less fulvous, especially in females; hind coxa fulvous, more or less ivory apically, especially in males, in occasional males entirely ivory; hind trochanters ivory to fulvous; hind femur fulvous, its apex broadly white, especially above; hind tibia white, its basal 0.17± and apical 0.28± fuscous; hind tarsus white, its last segment fuscous except basally.

Type: ♀, Takoma Park, Md., July 12, 1943, H. and M. Townes (Washington, USNM 63670).

Paratypes (60♂, 116♀): From Colorado (Creede at 8,800 ft.); Connecticut (Lebanon); District of Columbia (Georgetown); Kansas (Lawrence); Maine (Camp Kennedy at 3,000 ft. on Mount Katahdin and Casco); Manitoba (Red Deer River); Maryland (Takoma Park); Michigan (George Reserve in Livingston Co., Marquette Co., and Oakland Co.); New Hampshire (Randolph and White Mts.); New Jersey (Moorestown); New York (Farmingdale, Ithaca, Oneonta, and Poughkeepsie); North Carolina (Mount Pisgah at 4,800 to 5,300 ft., Marshall, Mount Mitchell at 5,000 to 6,711 ft., "Smith's Cove," and Wake Co.); Nova Scotia (White Point Beach in Queens Co.); Ohio (Columbus); Ontario (Vineland Station and Waubamick); Pennsylvania (Spring Brook and Youngwood); Rhode Island (Westerly); and Virginia (Charlottesville, Falls Church, Great Falls, and between Scotts Run and Bolts Hill).

Most dates of collection are from June 15 to the end of August. Those outside of this range are: May 23 at Lawrence, Kans.; May 28 and June 1 at Ithaca, N. Y.; June 11 at Takoma Park, Md.; June 14 at Waubamick, Ont.; September 1, 6, 10, and 11 at Takoma Park, Md.; and November 2 at Charlottesville, Va.

There are ten reared specimens: 2♂, 6♀, from *Acleris oxycoccana*, White Point Beach, Queens Co., N. S., Aug. 13, 16, 18, 20, and 22, 1935, J. McDunnough; and 2♀, from *Episimus argutanus*, Vineland Station, Ont., Aug. 15 and 22, 1939, W. L. Putnam.

We have collected the species many times by sweeping in the undergrowth of deciduous woods.

This species is in the Alleghenian and Carolinian faunas. Adults occur from late spring to early fall, but are commonest in July and August.

41. Exochus spilotus, new species

FIGURES 190,g; 195,d

Male: Unknown.

Female: Front wing 5.0 to 5.3 mm. long; combined face and clypeus about 1.05 as high as wide, strongly convex vertically but somewhat flattened below, moderately convex horizontally, their punctures rather coarse and strong, subadjacent on face and abruptly sparser on clypeus; apical angle of interantennal process about 90 degrees; median swelling of frons strong and sharply delimited; hind ocellus separated from eye by about 1.05 its long diameter; median half of clypeal margin straight; mandible with rather small punctures, moderately broad basally, narrowed apically, abruptly narrowed at base of its lower tooth, the lower tooth very small; costula entirely absent or represented by very short stubs; second lateral area of propodeum with a few hairs basally and in apicolateral corner; hind femur about 2.02 as long as deep; front spur of hind tibia about 2.65 as long as wide; punctures on second abdominal tergite small but sharp, very sparse or absent medially, the sublateral punctures separated by about 2.0 their diameter.

Black. Face, clypeus, cheek, small spot at top of eye, mouth parts, under side of scape and pedicel, upper margin of pronotum, tegula, and usually postscutellum and apex and lateral margin of scutellum, pale yellow, the face with a median vertical brown area and a large brown spot next to each clypeal fovea, and the tegula with a postmedian fulvous area. The yellow upper margin of pronotum is wide posteriorly and tapers forward, usually reaching the epomia. Flagellum brown below; pleura with a small fulvous area next each coxa; coxae, trochanters, and femora fulvous, the apex of front and middle coxae and femora and usually apex of hind femur above, pale yellow; front tibia and front and middle tarsi yellowish fulvous; middle tibia yel-

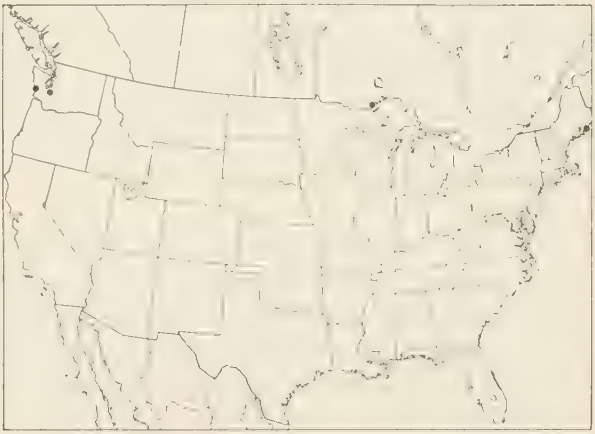


FIGURE 146.—Localities for *Exochus spilotus*.

lowish on basal half, infuscate fulvous on apical half, more uniformly fulvous beneath; hind tibia white, its basal 0.20± and apical 0.27± (as measured on upper edge), blackish, on the front face the apical black mark 0.40± the tibial length; hind tarsus white, the apical 0.75 of the last segment blackish.

Type: ♀, Ashford, Wash., Aug. 18, 1940, H. and M. Townes (Washington, USNM 63671).

Paratypes: ♀, Northeast Harbor, Maine, Aug. 11, 1909, C. S. Minot (Washington). ♀, reared from tortricid, Fort William, Ont., 1945 (Ottawa). ♀, Westport, Wash., July 17, 1940, H. and M. Townes (Townes).

This species is known from Maine, Ontario, and Washington.

42. Exochus dorsalis Cresson

Figure 190,h

Front wing 3.8 to 6.0 mm. long; combined face and clypeus about 1.04 as high as wide in male, about 1.02 as high as wide in female, its upper part moderately convex, just above the middle strongly convex, below this point more or less flattened, in the female discally almost or quite flat or discally concave; punctures of face and clypeus coarse, on face subadjacent, on clypeus abruptly very much sparser; apical angle of interantennal process about 105 degrees; median swelling of frons very strong and very strongly delimited; hind ocellus separated from eye by about 0.75 its long diameter in male, by about 0.87 its long diameter in female; median half of clypeal margin weakly concave; mandible with scattered, medium sized punctures, moderately wide, tapered toward apex and rather abruptly narrowed near base of teeth, its lower tooth very small; costula absent or incomplete, sometimes complete; second lateral area of propodeum with a few hairs basally and apicolaterally; nervulus distad of basal vein by about 0.4 its length; hind femur from 1.60 to 2.20 as long as wide, according to the sex and subspecies; front spur of hind tibia from about 2.0 to 2.5 as long as wide, according to the sex and subspecies; second tergite with rather small sharp punctures, medially almost or quite impunctate, sublaterally the punctures separated by about 2.0 their diameter; male clasper moderately wide, moderately hairy, rather abruptly, obliquely narrowed from below, its apex sharply rounded.

Black. Face, frontal orbit (wide below, tapered above) almost or quite confluent with spot at top of eye, unusually large spot at top of eye, cheek, lower part of temple, mouth parts, scape below, often pedicel below, upper margin of pronotum (very wide behind, tapered forward to epomia), tegula, subtegular ridge, postscutellum, and broad apex and sides of scutellum, ivory white; black ground color of head sometimes more or less replaced with ferruginous; flagellum brown below; lower part of propleurum fulvous or whitish; lower part of pronotum fulvous; pronotum fulvous to black, except as described otherwise; mesosternum and metasternum fulvous, the mesosternum more or less whitish, especially in male; mesopleurum fulvous, its prepectus more or less whitish, below its subtegular ridge more or less infuscate; metapleurum fulvous; mesoscutum fulvous to black, most often fulvous; disc of scutellum fulvous; pleural areas of propodeum often more or less fulvous; front and middle legs ivory white, often generally stained with stramineous, the coxae more or less fulvous, the femora pale fulvous except apically, and the apical 0.45 of tibiae fulvous, at least dorsally and in some females infuscate, especially on the middle tibia; hind coxa more or less ivory apically; hind trochanters ivory to fulvous; hind femur fulvous, with a large conspicuous ivory area apically above; hind tibia white, its basal 0.17± and apical 0.26± blackish; hind tarsus white, its last segment blackish except basally.

There is a northern and a southern subspecies as distinguished below:

1. Hind femur 2.10 to 2.20 as long as wide in male, 1.66 to 1.97 as long as wide in female; combined face and clypeus a little less strongly flattened below than in *E. dorsalis dorsalis*, in female the lower part being discally very weakly convex; range: transcontinental in Transition zone.
42a. dorsalis pictilis, new name

Hind femur 1.89 to 2.00 as long as wide in male, 1.60 to 1.66 as long as wide in female (fig. 195,e); combined face and clypeus a little more strongly flattened below than in *E. dorsalis fylesi*, in female the lower part being discally flat or slightly concave; range: Carolinian and Austroriparian faunas.
42b. dorsalis dorsalis Cresson

42a. Exochus pictilis Walkley

Exochus pictilis Walkley, *in* Krombein et al, U.S. Dep. Agr., Agr. Monogr. 2, 1st Suppl., p. 59.

Amesolytus pictus Fyles, 1904, Canadian Ent., vol. 36, p. 207; [♀] (preoccupied in *Exochus* by Holmgren, 1856). Type: ♀, Levis, Que. (Washington).

Front wing 4.5 to 6.0 mm. long; thorax moderately depressed; lower part of combined face and clypeus of female discally very weakly convex; hind femur about 2.15 (2.10 to 2.20) as long as wide in male, about 1.80 (1.66 to 1.97) as long as wide in female; front spur of hind tibia about 2.5 as long as wide in male, about 2.3 as long as wide in female.

Pronotum discally and mesoscutum black to fulvous, usually fulvous.

Specimens: ♀, Canterbury, Conn., July 25, 1937, M. Chapman (Townes). ♂, East Lansing, Mich., July 27, 1939 (East Lansing). ♂, St. Anthony Park near Minneapolis, Minn., June 22, 1910, "E. C. P."

(St. Paul). ♂, Traverse Co., Minn., O. W. Oestlund (St. Paul). ♂, 2♀, reared from leaf roller on sumac (*Rhus*), Ottawa Co., Ohio, collected July 27, 1943, emerged Aug. 19 and 30, 1943, Neal and Gielow (Washington). ♀, Ohio, C. H. Kennedy (Washington). ♂, Normandale, Ont., June 26, 1939, G. S. Walley (Ottawa). ♂, Point Pelee, Ont., May 31, 1929, G. S. Walley (Ottawa). ♂, Lac Mercier, Que., Aug. 16, 1937, G. S. Walley (Ottawa). ♀ (type), reared from *Meroptera pravella* on sumac (*Rhus*), Levis, Que., T. W. Fyles (Washington). ♂, Westerly, R. I., Aug. 28, 1951, H. and M. Townes (Townes). ♀, Asotin Co., Wash., June 24, 1932, J. M. Aldrich (Washington). ♀, Juneau Co., Wis., Sept. 2, 1949, W. McNeal (Madison). There are also two females from Put-in-Bay, Ohio, which are intermediate to the subspecies *dorsalis*. These are as follows: ♀, June 30, 1922 (Townes), ♀, July 24, 1927, R. C. Osburn (Townes).

This subspecies is transcontinental, mostly in the Transition zone.

42b. Exochus dorsalis dorsalis Cresson

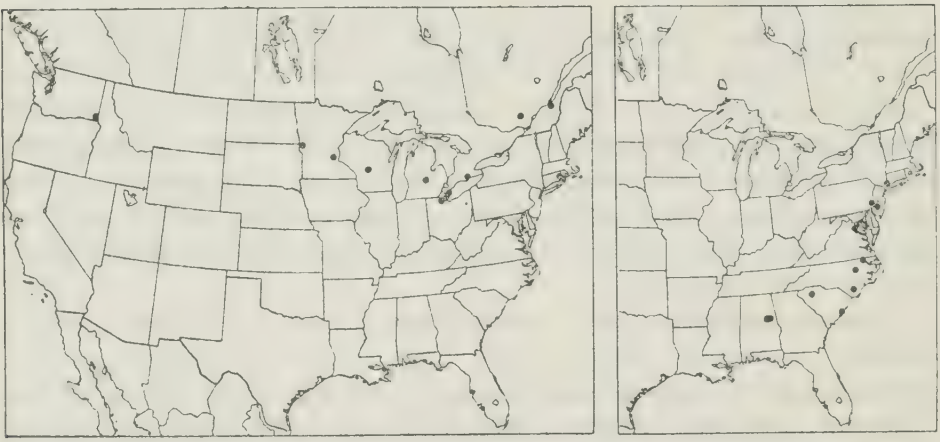
FIGURE 195,e

Exochus dorsalis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 286; "♂" = ♀. Type: ♀, New Jersey (Philadelphia).

Front wing 3.8 to 5.6 mm. long; thorax strongly depressed; lower part of combined face and clypeus of female discally flat or weakly concave; hind femur about 1.95 (1.89 to 2.00) as long as wide in male, about 1.65 (1.60 to 1.66) as long as wide in female; front spur of hind tibia about 2.2 as long as wide in male, about 2.0 as long as wide in female.

Pronotum discally and mesoscutum always fulvous.

Specimens (29♂, 28♀): From Alabama (Coleta and Pyriton); Maryland (Bowie and Takoma Park); New Jersey (Moorestown);



FIGURES 147, 148.—Localities, subspecies of *Exochus dorsalis:* 147 (left), *fylesi;* 148 (right), *dorsalis.*

New York (Pelham Bay Park); North Carolina (Elizabethtown, Murfreesboro, and Wake Co.); Pennsylvania (Valley Forge); South Carolina (McClellanville and Greenville); and Virginia (Mount Vernon).

Most collection dates are from July 1 to the end of August. Those outside of this range are: April 25 at Elizabethtown, N. C.; May 18 at McClellanville, S. C.; June 23 at Moorestown, N. J.; June 24 and 29 at Bowie, Md.; June 30 without locality; September 6 and 11 and October 9 at Takoma Park, Md.; September 15 in Wake County, N. C.; and September 27 at Murfreesboro, N. C.

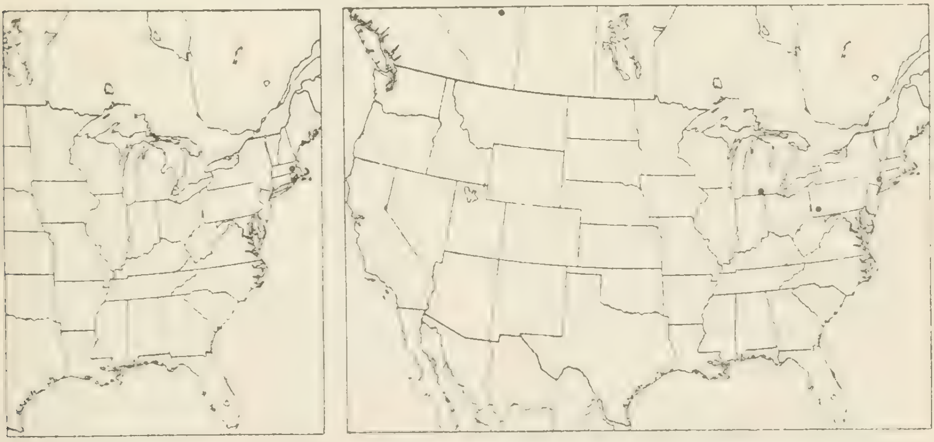
We have found the species common at times in the undergrowth of deciduous woods. When caught, it gives off a strong odor like the species of *Coccygomimus*. Field notes made Sept. 11, 1943 at Takoma Park, Md., state that males were abundant on that date, resting on, and flying about the tips of branches of shrubs in the woods, from near the ground to a height of 1.5 meters.

This subspecies is in the Carolinian and Austroriparian faunas. Adults occur mostly in July and August, but there are a few from late spring to early fall.

43. Exochus fastigatus, new species

Figures 190,i; 195,f

Front wing 3.5 to 3.8 mm. long; combined face and clypeus about 1.20 as high as wide in male, about 1.25 as high as wide in female, their convexity uniform, moderately strong; apical angle of interantennal process about 90 degrees; median 0.5 of clypeal margin straight; median area of frons very weakly raised and hardly differentiated; mandible moderately short (about 0.60 as long as mouth opening is wide), not twisted, tapered evenly from base to a rather narrow apex.



Figures 149, 150.—Localities: 149 (left), *Exochus fastigatus;* 150 (right), *E. canidens.*

its outer face with a very few punctures, its upper tooth small, its lower tooth smaller than upper tooth (as usual); second lateral area of propodeum with hairs laterally and apicolaterally; front spur of hind tibia about 2.6 as long as wide in male, about 2.5 as long as wide in female; punctures of second tergite moderately small, moderately sharp, absent medially, sublaterally separated by about 2.0 their diameter; male clasper moderately broad, moderately hairy, its apex obliquely rounded from below.

Black. Face, narrow orbit on lower part of frons, triangular spot at top of eye, cheek, clypeus, mouth parts, large upper hind corner of pronotum, tegula, and margin of subtegular ridge, pale yellow; antenna brown, paler below, the scape usually yellow beneath; front and middle legs of male pale yellow, their femora mostly pale fulvous except apically; front and middle legs of female light fulvous, their coxae and femora apically and basal half of their tibiae pale yellow; hind coxa of male fulvous basally, pale yellow apically, of female entirely fulvous; hind trochanters fulvous; hind femur fulvous, in the male broadly pale yellow apically above, in the female sometimes with a small pale yellow area apically above; hind tibia and tarsus yellowish stramineous, the tibia tinged with fulvous at extreme base and on sides and bottom, and its apical 0.22 ± fuscous, the fuscous apex shading basally into the fulvous area; hind tarsus brownish at apex; lateral part of second to fourth tergites sometimes yellowish in male, fulvous in female, the pale areas (when present) largest on the third tergite.

Type: ♀, reared from ?*Ancylis comptana* on *Arctostaphylos*, Bar Harbor, Maine, June 20, 1936 (Washington, USNM 63672).

Paratypes: 2♂, 1♀, same data as type (Washington and Townes). ♀, Holliston, Mass., September 8, N. Banks (Cambridge). ♀, Westerly, R. I., August 25, 1946, M. Townes (Townes).

44. Exochus canidens, new species

FIGURES 190,j; 195,g

Male: Unknown.

Female: Front wing 3.4 to 4.3 mm. long; combined face and clypeus about 1.25 as high as wide, their convexity uniform, moderately strong; apical angle of interantennal process about 95 degrees; median 0.5 of clypeal margin straight; median area of frons very weakly raised and hardly differentiated; mandible moderately long (about 0.77 as long as mouth opening is wide), not or faintly twisted, tapered weakly from base for about 0.6 its length, then more strongly tapered to a moderately wide apex, its outer face with a few punctures, its lower tooth small, its upper tooth rather long; second lateral area of propodeum with a few hairs in apicolateral corner; front spur of hind tibia about 2.7 as long as wide; punctures of second tergite moderately small, moderately sharp, absent medially, sublaterally separated by about 2.0 their diameter.

Colored like the female of *E. fastigatus* except that the abdomen is always entirely black.

Type: ♀, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Washington, USNM 63673).

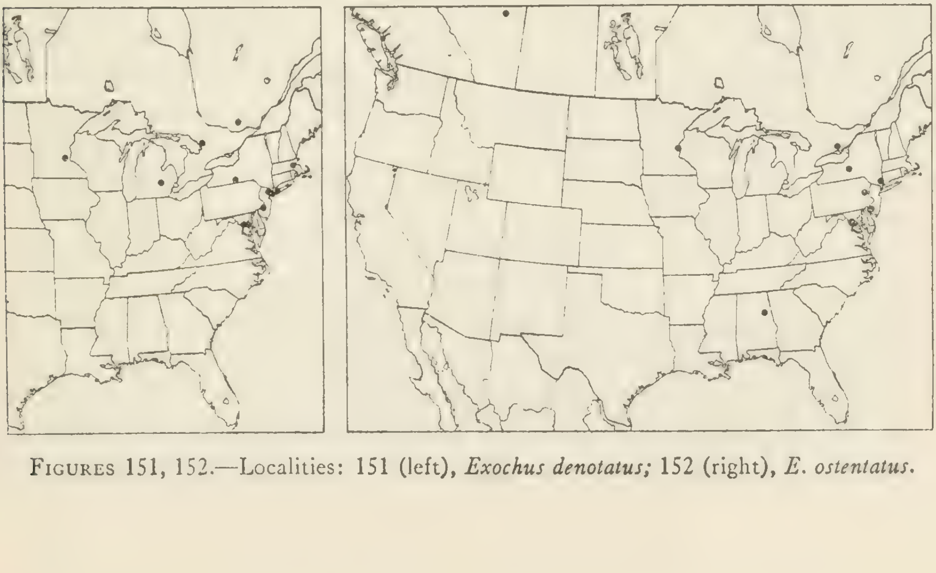
Paratypes: ♀, Edmonton, Alta., July 31, 1947, E. H. Strickland (Townes). ♀, Branch Co., Mich., Sept. 7, 1953, R. R. Dreisbach (Dreisbach). ♀, Pittsburgh, Pa. (Cambridge).

45. Exochus denotatus, new species

FIGURES 190,k; 195,h

Front wing 4.2 to 5.6 mm. long; combined face and clypeus about 1.12 as high as wide in male, about 1.19 as high as wide in female, their convexity uniform, rather strong; apical angle of interantennal process about 115 degrees; median 0.5 of clypeal margin straight; median area of frons very weakly raised and hardly differentiated; mandible of moderate length, not twisted, tapered rather evenly from base to its apex of moderate width, its lower tooth quite short and upper tooth moderately long, its outer face with a few moderate-sized punctures; second lateral area of propodeum with a few hairs in its apicolateral corner; front spur of hind tibia about 2.4 as long as wide in male, about 2.3 as long as wide in female; punctures of second tergite moderately coarse, rather sharp, medially very sparse or absent, sublaterally separated by about 1.5 their diameter; male clasper moderately broad, rather hairy, its apex obliquely rounded from below.

Black. Face, lower half of frontal orbit, spot at top of eye, cheek, clypeus, mouth parts, under side of scape, broad upper margin of



FIGURES 151, 152.—Localities: 151 (left), *Exochus denotatus;* 152 (right), *E. ostentatus.*

pronotum (broadest behind and reaching forward to in front of epomia) tegula, subtegular ridge, narrow side and apex of scutellum, and postscutellum, ivory white; flagellum brown beneath; mesosternum, metasternum, lower part of propleurum, mesopleurum except just beneath subtegular ridge, and metapleurum all usually ferruginous or fulvous but sometimes more or less black or entirely black except for part of metapleurum; upper part of prepectus of male marked with yellow; pleural part of propodeum sometimes ferruginous or fulvous; front and middle coxae fulvous, ivory apically; front and middle trochanters ivory in male, mostly fulvous in female; front and middle femora fulvous, ivory apically, especially in front; front and middle tibiae ivory with pale fulvous areas; front and middle tarsi pale stramineous, whitish basally; hind coxa, trochanters, and femur fulvous, the extreme apex of femur a little infuscate; hind tibia white, its apical 0.35± blackish on dorsal edge, the blackish area extending basad laterally and ventrally to near midlength of tibia, the blackish area averaging darker and more extensive in males than in females; hind tarsus white, the apex of its first four segments and apical half of its fifth segment pale brown to blackish.

Type: ♀, Mayo Beach, Md., Oct. 27, 1945, H. and M. Townes (Washington, USNM 63674).

Paratypes: 3♂, 2♀, same data as type (Townes). ♂, Takoma Park, Md., June 21, 1943, H. and M. Townes (Townes). ♂, Holliston, Mass., Aug. 14, N. Banks (Cambridge). ♂, ♀, George Reserve, Livingston Co., Mich., July 1 and Aug. 21, 1956, H. Townes (Townes). ♀, bred from leaf roller on *Spiraea*, St. Paul, Minn., July 31, 1936, D. J. Pletsch (St. Paul). ♂, bred from *Zomaria interuptolineana*, Essex Co., N. J., July 29, W. D. Kearfott (Washington). ♂, Moorestown, N. J., July 27, 1939, H. and M. Townes (Townes). ♂, Elmira, N. Y., Aug. 4, 1937, H. Townes (Townes). ♂, ♀, Farmingdale, N. Y., Aug. 14 and 23, 1938, H. and M. Townes (Townes). ♂, Van Courtland Park, N. Y., July 20, 1913, (Ithaca). ♂, Bala, Ont., July 19, 1922, G. S. Walley (Ottawa). ♀, "New Cumberland," Pa., May 8, 1909, P. R. Myers (Washington). ♀, Kazabazua, Que., Aug. 17, 1927, G. S. Walley (Ottawa).

This species occurs from Quebec to Maryland and west to Minnesota.

46. Exochus ostentatus Davis

FIGURES 190,l; 195,i

Exochus ostentatus Davis, 1897, Trans. Amer. Ent. Soc., vol. 24, p. 217; ♂. Type: ♂, District of Columbia (Philadelphia).

Front wing 3.4 to 4.7 mm. long; combined face and clypeus about 1.17 as high as wide in both sexes, their convexity uniform, moderately strong; apical angle of interantennal process about 100 degrees;

median 0.5 of clypeal margin moderately concave; median area of frons very weakly raised and hardly differentiated; mandible moderately large, twisted, its apical third rotated from plane of its condyles about 25 degrees in male, about 40 degrees in female, the rotation in a direction to place the lower tooth of mandible nearer mouth opening; mandible evenly tapered from base to apex, its outer face moderately convex, with scattered punctures, its teeth moderately large; second lateral area of propodeum with a few hairs laterally and apicolaterally; front spur of hind tibia about 2.65 as long as wide in male, about 2.5 as long as wide in female; punctures of second tergite of moderate size and sharpness, very sparse or absent medially, the sublateral ones separated by about 1.4 their diameter; male clasper of moderate width, rather densely hairy, tapered from below to a rounded point.

Black. Face, frontal orbit (sometimes continuous with spot at top of eye), large triangular spot at top of eye, cheek, lower 0.4 ± of temple, clypeus, mouth parts, front of scape, upper margin of pronotum (wide behind, narrow in front, reaching forward about to epomia), often anteroventral edge of pronotum, lower part or most of propleurum, tegula, subtegular ridge, narrow apex and narrower side of scutellum, and usually postscutellum, ivory; flagellum tan beneath in male, brown beneath in female; male mesosternum almost entirely and mesopleurum and side of pronotum largely, ivory, the rest of mesopleurum and pronotum fulvous except for blackish area below subtegular ridge; male metapleurum fulvous and ivory; male scutellum fulvous bordered with ivory; female pronotum usually largely fulvous with its anterodorsal part black, sometimes entirely black except for its ivory upper edge; mesosternum, nearly always metasternum, metapleurum, mesopleurum except for blackish area beneath subtegular ridge, and disc of scutellum fulvoferruginous; female mesoscutum fulvoferruginous (with a blackish margin) to black (with a ferruginous central area); pleural part of female propodeum often fulvoferruginous; front and middle legs ivory, the basal 0.7 ± of their femora and apical 0.5 ± of their tibiae tinged with fulvous (faintly tinged in male, distinctly tinged in female); hind coxa and trochanters ivory tinged with fulvous in male, in female light fulvous with the coxa apically tinged with ivory; hind femur very pale fulvous in male, medium fulvous in female, the apex distinctly infuscate, especially above, the femur more or less whitish above just basad of apical fuscous mark; hind tibia white, its apical 0.28 ± fuscous brown; hind tarsus white, its fifth segment brown at apex; apicolateral corner of second, third, fourth, and occasionally also fifth tergites usually stramineous, the stramineous marks largest on third tergite. Sometimes the tergites are entirely blackish.

Specimens: ♀, Pyriton, Ala., H. H. Smith (Washington). ♂, Edmonton, Alta., July 5, 1947, E. H. Strickland (Edmonton). ♂ (type) District of Columbia (Philadelphia). ♂, ♀, Takoma Park, Md., July 4 and 5, 1942, H. and M. Townes (Townes). 2♀, Takoma Park, Md., July 1, 1943 and Aug. 23, 1943, H. and M. Townes (Townes). ♀, Chisago Co., Minn., July 15, 1911 (St. Paul). ♀, Glassboro, N. J., Aug. 12, 1942, W. F. Rapp, Jr. (Washington). ♀, in grass bog, McLean Reserve, Tompkins Co., N. Y., Sept. 12, 1914 (Ithaca). ♂, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Townes). ♀, Chatterton, Ont., July 22, 1951, John C. Martin (Ottawa). ♀, Swiftwater, Pa., Aug. 12, 1939, T. R. Gardner (Townes). ♀, J. C. Bridwell (Washington).

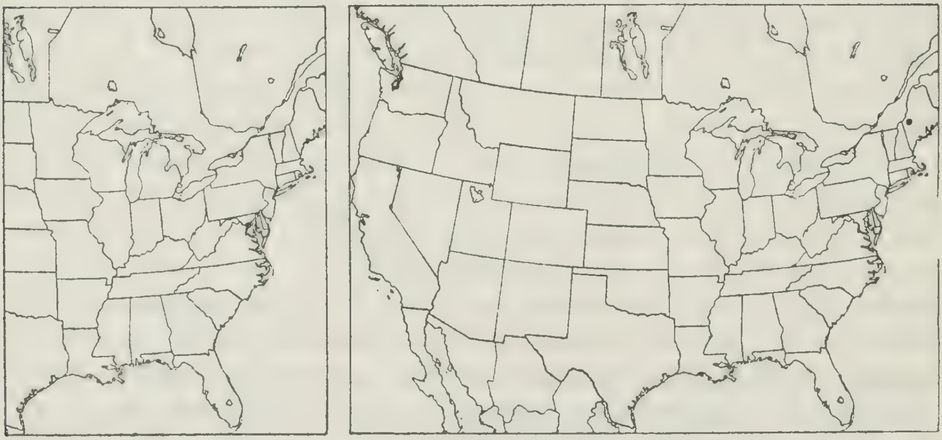
This species occurs from New York to Alabama and westward to Alberta.

47. Exochus quadradens, new species

Figures 190,m; 196,a

Male: Unknown.

Female: Front wing 4.0 to 4.3 mm. long; combined face and clypeus about 1.19 as high as wide, their convexity uniform, moderately strong; apical angle of interantennal process about 115 degrees; median 0.5 of clypeal margin faintly concave; median area of frons very weakly raised and very weakly differentiated; mandible moderately large, not twisted, rather broadly rectangular, only very little narrowed from its condyles to the base of its teeth, its outer face moderately punctate, its lower tooth very broad and short, its upper tooth moderately long; second lateral area of propodeum with a few hairs in apicolateral corner; front spur of hind tibia about 2.5 as long as wide; punctures of second tergite moderately small, sharp, very sparse or absent medially, the sublateral ones separated by about 1.5 their diameter.



Figures 153, 154.—Localities: 153 (left), *Exochus quadradens;* 154 (right), *E. cuneatus.*

Black. Face, frontal orbit (sometimes narrowly connected with spot at top of eye), large triangular spot at top of eye, cheek, lower 0.4± of temple, mouth parts, front of scape, upper hind part of pronotum (very wide posteriorly, narrowing anteriorly and reaching just forward of epomia), tegula, subtegular ridge, area on upper part of prepectus, and obscure apex of scutellum, pale yellow; flagellum brown beneath; lower half of propleurum pale fulvous; mesopleurum and metapleurum partly ferruginous or suffused with ferruginous; front and middle legs pale yellow, their femora on basal 0.7± and their tarsi apically tinged with fulvous; hind coxa fulvous, ivory apically above; hind trochanters yellowish fulvous; hind femur fulvous, faintly infuscate at apex above; hind tibia whitish, largely pale fulvous below, its apical 0.24± dark brown; hind tarsus white, its apical segment mostly brown.

Type: ♀, Takoma Park, Md., Aug. 9, 1943, H. and M. Townes (Washington, USNM 63675).

Paratypes: 4♀, Takoma Park, Md., Aug. 5, 9, 19, and 25, 1943, H. and M. Townes (Townes).

48. Exochus cuneatus, new species

FIGURES 190,n; 196,b

Male type: Front wing 3.7 mm. long; combined face and clypeus 0.83 as high as wide, rather strongly convex, the face medially with a weak longitudinal ridge on its upper 0.7 (this may be an abnormality in the single specimen at hand); apical angle of interantennal process 110 degrees; median area of frons moderately raised but below the median ocellus much more strongly raised as a narrow, wedge-shaped swelling that terminates ventrally between antennal sockets in a high bladelike carina; median 0.5 of clypeal margin straight; mandible of moderate size, weakly twisted toward its apex, evenly tapered from base to a narrow apex, its outer face rather convex and sparsely punctate, its lower tooth very small and upper tooth of moderate size; second lateral area of propodeum with hairs basally and medially; front spur of hind tibia 1.9 as long as wide; punctures of second tergite small, rather weak, medially very sparse or absent, the sublateral ones separated by about 1.7 their diameter.

Black: Face, lower lateral part of frons, large triangular spot at top of eye, cheek, lower 0.65 of temple, clypeus, mouth parts, front of scape, pronotum except anterodorsally, propleurum, tegula, subtegular ridge, mesosternum, mesopleurum except below subtegular ridge, metapleurum, front and middle legs, hind coxa, and lateral part of second through fifth tergites, pale whitish yellow; flagellum dark brown beneath; scutellum obscurely stramineous at apex; hind trochanters and femur pale fulvous, the femur pale whitish yellow apically above; hind tibia and tarsus whitish stramineous, the apical 0.28 of the tibia dark brown and apical half of fifth tarsal segment brown.

Type: ♂, bred from *Heterarthrus nemoratus*, Jimpond, Maine, June 2, 1937 (Washington, USNM 63676).

49. Exochus pleuralis Cresson

FIGURES 190,o; 196,c

Exochus pleuralis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 286; ♂. Type: ♂, Illinois (Philadelphia).

Exochus pallipes Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 287; ♂ (new synonymy). Type: ♂, Illinois (Philadelphia).

Exochus evectus Cresson, 1872, Trans Amer. Ent. Soc., vol. 4, p. 168; ♀. Type: ♀, Bosque Co., Tex. (Washington).

Exochus pallidipes Dalla Torre, 1901, Catalogus hymenopterorum, vol. 3, p. 213 (emendation).

Front wing 3.2 to 4.5 mm. long; combined face and clypeus about 1.03 as high as wide in male, about 0.97 as high as wide in female, their convexity stronger in a vertical direction than horizontally, especially in female; apical angle of interantennal process about 82 degrees; median area of frons rather strongly raised and differentiated; median 0.5 of clypeal margin approximately straight; mandible of moderate size, not twisted, tapered evenly but rather weakly from its condyles to a moderately wide apex, its lower tooth small and upper tooth large, its outer face rather convex and with a few small punctures; second lateral area of propodeum with hairs apicolaterally; punctures of second abdominal tergite of moderate size and sharpness, very sparse or absent medially, the sublateral ones separated by about 1.4 their diameter; front spur of hind tibia about 2.7 as long as wide in male, about 2.8 as long as wide in female; male clasper of moderate size and hairiness, its apex rounded, a little oblique.

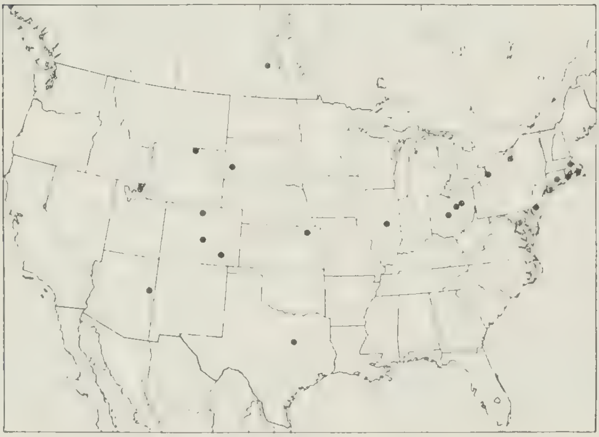


FIGURE 155.—Localities for *Exochus pleuralis*.

Male: Black. Face, lower half of frontal orbit, large triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, scape in front, propleurum except sometimes above, upper margin of pronotum (very widely behind, tapering forward and ending near notaulus or in front of epomia), tegula, and subtegular ridge, pale yellow; flagellum brown below, blackish brown above; pronotum mostly fulvous, pale yellow above and with some yellowish tinges elsewhere, black anterodorsally; mesosternum, mesopleurum largely or entirely except under subtegular ridge and sometimes above its coxa, metapleurum largely or entirely, and usually more or less of metasternum, pale yellow, fulvous in various proportions; scutellum sometimes fulvous, more or less yellow at apex; postscutellum usually yellow; propodeum sometimes yellowish or fulvous laterally and apically; front and middle legs pale yellow, the basal 0.7 of their femora (especially behind) and apical 0.5 of their tibiae pale fulvous; hind coxa fulvous, partly yellowish apically; hind trochanters pale fulvous; hind femur fulvous, the apex often more or less pale yellowish above; hind tibia pale yellow, brown or brownish fulvous apically, the apical dark marks occupying about 0.25 its length dorsally, extending about 0.65 its length and becoming paler on the lateral and ventral sides; hind tarsus whitish, the apex of the first through fourth segments and the fifth segment except at its base, stramineous to light brown; tergites entirely black or the basal four or five tergites more or less extensively stramineous on their lateroapical corners and less frequently and more narrowly stramineous along their lateral and apical edges.

Female: Black. Face, lower 0.4± of frontal orbit, large triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, scape in front, large hind corner of pronotum, tegula, subtegular ridge, often narrow apex of scutellum, and often narrow line on postscutellum, pale yellow; flagellum blackish brown above, brown below; scutellum often more or less fulvous; pleura fulvous next to each coxal attachment; front and middle coxae fulvous, pale yellowish apically; front and middle trochanters and femora fulvous, the apical 0.3± of the femora pale yellowish; front and middle tibiae and tarsi pale yellowish, the tarsi and apical 0.5± of the tibiae tinged with fulvous; hind coxa, trochanters, and femur fulvous; hind tibia pale yellowish, its apical 0.33± brownish fulvous, laterally and ventrally the darker apical coloration extending basad to near basal 0.3 of tibia and fading to pale fulvous; hind tarsus whitish, the apex of first through fourth segments and fifth segment except basally, stramineous. Sometimes the face has poorly defined brownish lines and/or spots.

Specimens (47♂, 26♀): From Arizona (near Alpine); Colorado (Florissant, Indian Meadows on the La Poudre River, and Rocky Ford); Connecticut (East River); Illinois (Decatur); Kansas (Onaga);

Manitoba (Riding Mt. Park); Maryland (Takoma Park); Massachusetts (Dedham and Woods Hole); New Jersey (Moorestown); New York (Farmingdale, Orchard Park, and Oswego); Ohio (Barberton, Delaware Co., and Wayne Co.); Rhode Island (Westerly); South Dakota (Harney Peak); Texas (Bosque Co.); Utah (Logan, North Logan, Providence, and "River Heights"); Wyoming (mountains near Sheridan); and Yukon (Canyon Creek).

Most of the collection dates are from June 17 to the end of August. Dates outside of this range are: April 25 at Takoma Park, Md.; May 24, 25, and 29 near Alpine, Ariz.; June 2 in Delaware Co., Ohio; June 3 in Riding Mt. Park, Man.; June 4 without locality; June 12 at Decatur, Ill.; and September 1 and 3 at Westerly, R. I.

The species has been reared from *Ancylis comptana* in Colorado (Rocky Ford); Ohio (Wayne Co.); and Utah (North Logan, Providence, and River Heights). Other rearings are: 3♂, from cinquefoil (*Potentilla*) leaf roller, Wayne Co., Ohio, June 18, 1944; ♂, from *Anacampsis agrimoniella*, Decatur, Ill., June 12, 1918, Barnes; ♂, from larva on *Populus*, Dedham, Mass.; and ♀, from "*Peronea*" on *Viburnum*, East River, Conn., July 10, 1912, C. R. Ely.

This species ranges from the Atlantic west to Arizona and Utah, mostly in the upper Austral zone. Adults occur from late spring through the summer.

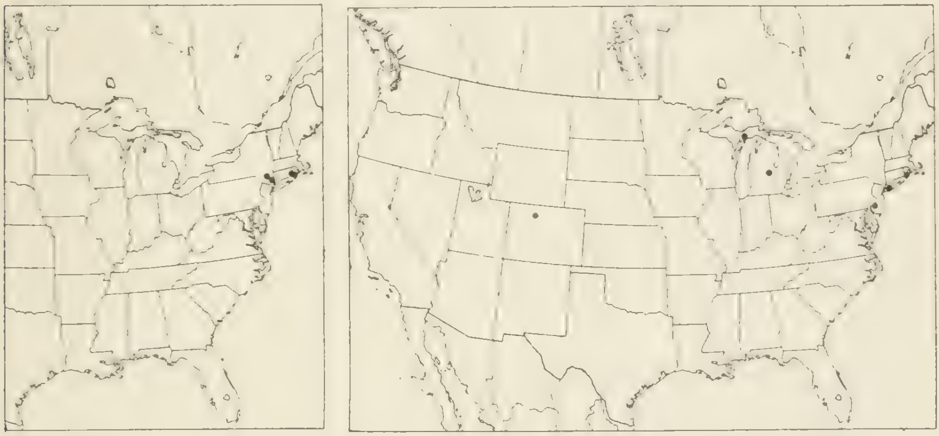
50. Exochus mesodon, new species

Figures 190,p; 196,d

Male: Unknown.

Female: Front wing 3.9 to 4.6 mm. long; combined face and clypeus about 0.89 as high as wide, moderately convex in vertical plane, broad and rather weakly convex in horizontal plane; apical angle of interantennal process about 80 degrees; median area of frons rather strongly raised and differentiated; median 0.5 of apical margin of clypeus faintly concave; mandible very large, twisted, its apical part rotated from plane of its condyles by about 60 degrees (placing the lower tooth nearer mouth), a little tapered from its base to the base of its teeth, its outer face moderately convex and with a few coarse punctures, its lower tooth very short, its upper tooth big and long; second lateral area of propodeum with a few hairs basally and in its apicolateral corner; front spur of hind tibia about 2.9 as long as wide; punctures of second tergite of moderate size and sharpness, very sparse or absent medially, the sublateral punctures separated by about 1.5 their diameter.

Black. Face, lower 0.6 of frontal orbit, triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, front of scape, large hind corner of pronotum, tegula, subtegular ridge, sometimes area in upper part of prepectus, and often tinges or definite marks on side and apex of scutellum and on postscutellum, pale yellow; flagellum dark brown beneath; sometimes lower part of propleurum and some or most of mesopleurum and metapleurum fulvoferruginous; front and middle legs pale yellow, their coxae basally, femora except apically, and apical 0.5± of tibiae fulvous; hind coxa, trochanters, and femur fulvous, the coxa apically and the femur at apex above, pale yellowish; hind tibia whitish, its apical 0.3± fuscous; hind tarsus white, the apical half of its fifth segment brownish.



Figures 156, 157.—Localities: 156 (left), *Exochus mesodon;* 157 (right), *E. megadon.*

Type: ♀, Poughkeepsie, N. Y., Aug. 2, 1936, H. Townes (Washington, USNM 63677).

Paratypes: ♀, Voluntown, Conn., Aug. 29, 1951, H. and M. Townes (Townes). ♀, Shokan, N. Y., July 11, 1936, H. Townes (Townes). ♀, Westerly, R. I., July 8, 1936, M. Chapman (Townes).

51. Exochus megadon, new species

Figures 190,q; 196,e

Male: Unknown.

Female: Front wing 5.3 to 5.8 mm. long; combined face and clypeus about 0.77 as high as wide, their convexity weak in horizontal plane, moderately convex in vertical plane but somewhat flattened below; apical angle of interantennal process about 70 degrees; median area of frons rather strongly raised and differentiated; apical margin of clypeus broadly concave; mandible exceptionally large and long, twisted, its apical third rotated about 60 degrees from plane of its condyles (thus placing lower tooth nearer mouth), its shape apparently very narrow from facial view (due to twisting) but actually quite wide, its outer face with rather coarse punctures basally, its lower tooth short, its upper tooth very large; second lateral area of propodeum with a few hairs basally and in its apicolateral corner; front spur of hind tibia about 2.8 as long as wide; punctures of second tergite of moderate size, sharp, medially very sparse or absent, the sublateral punctures separated by about 1.5 their diameter.

Black. Face, lower 0.6± of temporal orbit, large triangular spot at top of eye, cheek, adjacent temple, clypeus, mouth parts, front of scape, upper margin of pronotum (wide posteriorly, tapered forward to reach epomia), tegula, subtegular ridge, spot or area in upper part of prepectus, and usually narrow side and apex of scutellum and narrow line on postscutellum, ivory; flagellum brown beneath; thoracic pleura and sterna more or less fulvous, usually entirely fulvous on lower half of propleurum, mesosternum, metasternum, mesopleurum and metapleurum except at sternaulus and below subtegular ridge; front and middle legs fulvous, their coxae and femora apically, tinges on trochanters, basal 0.5± of tibiae, and tarsi basally, whitish; hind coxa, trochanters, and femur fulvous, the coxa paler apically; hind tibia whitish, its apical 0.35± fuscous; hind tarsus white, the apical half of its fifth segment brown.

Type: ♀, Morristown, N. J., July 14, 1926 (Washington, USNM 63678).

Paratypes: ♀, Steamboat Springs, Colo., Aug. 6, 1948, H., M., G., D., and J. Townes (Townes). ♀, Delta Co., Mich., July 2, 1955, R. R. Dreisbach (Dreisbach). ♀, Gratiot Co., Mich., Aug. 24, 1946, R. R. Driesbach (Driesbach). ♀, Farmingdale, N. Y., July 15, 1938, H. and M. Townes (Townes). ♀, Westerly, R. I., Aug. 10, 1946, M. Townes (Townes).

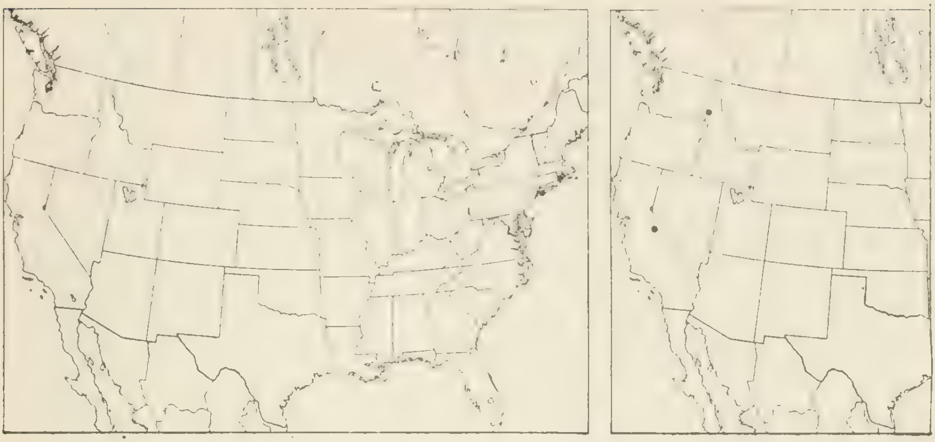
This species occurs from the Atlantic to Colorado, in the Transition zone.

52. Exochus ventricosus, new species

FIGURES 190,s; 196,f

Male: Unknown.

Female: Front wing 3.7 to 4.0 mm. long; combined face and clypeus about 0.87 as high as wide, strongly convex and bulging at and below the middle, almost flat above the middle; apical angle of interantennal process about 75 degrees; median area of frons rather strongly raised and differentiated; median 0.5 of clypeal margin faintly concave; mandible rather long, moderately wide, not twisted, weakly tapered from its condyles to base of its teeth then strongly constricted, its lower tooth very short and broad, its upper tooth long, its outer face with a few small punctures; second lateral area of propodeum with a few hairs in extreme base and apicolaterally; front spur of hind tibia about 3.0 as long as wide; punctures of second tergite of moderate size, sharp, medially absent, the sublateral punctures separated by about 1.5 their diameter.



FIGURES 158, 159.—Localities: 158 (left), *Exochus ventricosus;* 159 (right), *E. silus.*

Black. Face, lower 0.45± of frontal orbit, large triangular spot at top of eye, cheek, clypeus, mouth parts, front of scape, large hind corner of pronotum, tegula, and subtegular ridge, white; flagellum dark brown beneath; postscutellum and apex of scutellum with a narrow, obscure pale line; mesopleurum and metapleurum sometimes mostly fulvous; front and middle legs white, their coxae basally, basal 0.7± of femora, and apical 0.4± of tibiae pale fulvous; hind coxa, trochanters, and femur fulvous, the femur white apically above; hind tibia white, its apical 0.28± fuscous; hind tarsus white, the apical half of its fifth segment fuscous.

Type: ♀, Westerly, R. I., July 10, 1936, M. Chapman (Washington, USNM 63679).

Paratype: ♀, Farmingdale, N. Y., July 10, 1938, H. and M. Townes (Townes).

53. Exochus silus, new species

FIGURES 190,t; 196,g

Front wing 4.0 to 5.0 mm. long; combined face and clypeus about 0.92 as high as wide in male, about 0.80 as high as wide in female, in the male strongly convex below middle and weakly convex above middle, in female very strongly convex below middle and flat at and above middle; median area of frons very strongly and sharply elevated and differentiated; apical angle of interantennal process about 60 degrees; median half of clypeal margin approximately straight; mandible of moderate size, not or faintly twisted, moderately tapered from its base to the base of its teeth, its outer face with a few punctures; second lateral area of propodeum with a few hairs at extreme base and in lateroapical corner; punctures on second tergite small and sharp, absent medially, the sublateral punctures separated by about 1.4 their diameter.

Black. Face, rather small triangular spot at top of eye, cheek, mouth parts, spot on front of scape, large hind corner of pronotum, tegula, subtegular ridge, apex of scutellum, and postscutellum, pale yellowish, the face of female with a median subdorsal vertical stripe or elongate brown spot; flagellum dark brown beneath; front and middle legs fulvous, their coxae apically (especially in male) and male femora apically, paler fulvous or yellowish; hind coxa, trochanters, and femur fulvous; hind tibia fulvous, brownish at extreme base and in male with a subbasal yellow tinge; hind tarsus fulvous stramineous, the apex of first through fourth segments and fifth segment except basally, fulvous.

Type: ♀, "River Heights," Utah, July 12, 1935, C. F. Smith (Washington, USNM 63680).

Paratypes: ♀, Moscow Mt., Idaho, Aug. 4, 1936, Shull and Coon (Washington). ♂, near Glacier Point, Yosemite National Park, Calif., July 19, 1948, H., M., G., D., and J. Townes (Townes).

XI. MANDIBULARIS GROUP

Front wing 3.7 to 7.0 mm. long; head rather broad, with full temple and rather wide face that is weakly convex transversely and moderately convex in profile; interantennal process of face broadly triangular, not elongate; frons bulging just below the ocelli; cheek about 0.65 as long as basal width of mandible; occipital carina absent; clypeal margin strongly convex or subangulate medially; mandible of male normal for the genus, of female with a strong transverse subbasal groove, immediately apicad of which the mandible is strongly inflated; face, more or less of side of frons, spot at top of eye (often connected with frontal mark), lower part of temple, cheek, clypeus, and mouth parts yellow to white, the face sometimes with a median dark area; notaulus sharply impressed but very short; metapleurum without discal setae; costula present or absent; second lateral area of propodeum often with a very few hairs in its apicolateral corner, otherwise bare; apical transverse carina of propodeum complete; nervulus beyond the basal vein by about 0.6 its length; front spur of middle tibia about 0.5 as long as hind spur; second segment of middle tarsus about 1.5 as long as wide in male, about 1.2 as long as wide in female; hind tibia yellow or whitish, usually fuscous at base and apex; first tergite 1.55 to 2.5 as long as it is wide at basal corners; second tergite about 0.7 to 1.2 as long as wide, with small sharp punctures, very sparse medially, sublaterally with interspaces about 2.5 their diameter; epipleurum of third tergite oblong, broad, with a broadly rounded inner front corner.

This group is a specialized offshoot of the *tibialis* group, distinguishable on the convex clypeal margin and the specialized mandible of the female. It contains three known species, the two treated below and *Exochus citripes* Thomson 1887, of Europe.

54. Exochus decoratus Holmgren

Figures 188,k; 190,r,u

Front wing 4.4 to 7.0 mm. long; costula almost absent to complete; second lateral area of propodeum about 0.92 as long as wide; second tergite about 0.8 as long as wide, with about 400 hairs.

Coloration variable, according to the subspecies. The two Nearctic subspecies may be distinguished superficially from the closely related *E. mandibularis* by the fact that their mesopleurum is largely or entirely pale, rather than black with the subtegular ridge and a spot on the prepectus ivory. The European subspecies is colored rather like *E. mandibularis*.

The three subspecies are distinguished by the following key:

1. Mesopleurum black, part of the prepectus and often an adjacent area on mesopleurum whitish to fulvous; range: Europe and Japan.
54a. decoratus decoratus Holmgren
Mesopleurum mostly or entirely pale 2
2. Hind femur whitish on its apical 0.2 to 0.3 and the apical part of its dorsal edge, the rest fulvous; range: Alaska to Arizona.
54b. decoratus hebes, new subspecies
Hind femur entirely whitish or more or less fulvous on not more than its basal 0.6 (fig. 196,h); range: New Brunswick, Quebec, and Ontario, south to Georgia . . . . **54c. decoratus scitulus** Provancher

54a. Exochus decoratus decoratus Holmgren

Exochus decoratus Holmgren, 1873, Öfvers. Svenska Vetensk. Akad. Förh., vol. 30, p. 64; ♂. Type: ♂, Scania, Sweden (?Stockholm).

Male: Not known to the authors.

Female: Front wing 4.4 to 5.3 mm. long; costula complete or incomplete.

Black. Face, side of frons (narrowed above), spot at top of eye narrowly connected to mark on side of frons, clypeus, cheek, lower 0.4 of temple, mouth parts, under side of scape and pedicel, lower half of propleurum, hind corner of pronotum, tegula, subtegular ridge, spot on prepectus, sometimes a median spot on mesoscutum, scutellum apically and laterally, postscutellum, front and middle legs, apical 0.2± of hind femur, and apical part of dorsal edge of hind femur, pale yellow; flagellum brown beneath; mesopleurum often with a yellow and fulvous area adjacent to yellow spot on prepectus; front and middle femora and apex of their tibiae tinged with fulvous; hind tibia and tarsus whitish, the basal and apical 1.5 of the tibia fuscous and the apex of the last tarsal segment brownish.

Specimens: Described from a female from Belgium and two females from Japan.

54b. Exochus decoratus hebes, new subspecies

Male: Unknown.

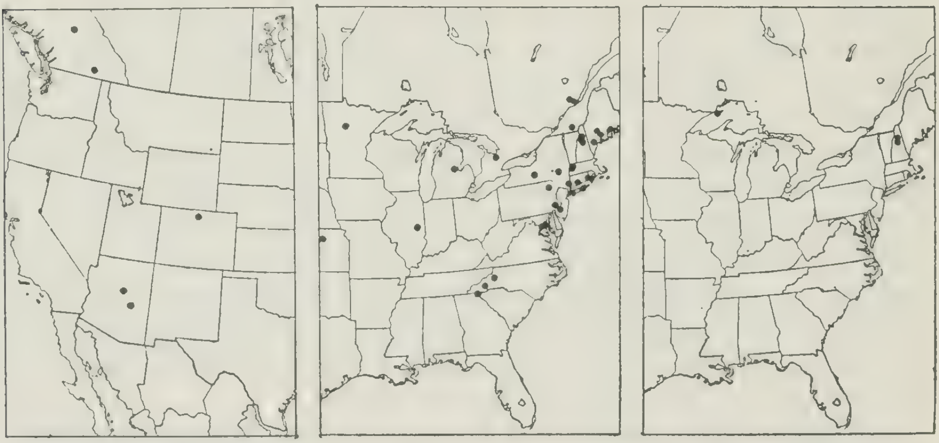
Female: Front wing 5.0 to 5.6 mm. long; costula usually complete, though weak centrally.

Black. Face, side of frons (narrowed above), spot at top of eye that may be connected to mark on side of frons, clypeus, cheek, lower 0.4 of temple, mouth parts, under side of scape and pedicel, lower half or more of propleurum, upper hind part and lower corner of pronotum, tegula, subtegular ridge, large area on prepectus which is sometimes prolonged backward on disc of mesopleurum, mesopleurum next to socket of middle coxa, side and apex of scutellum, postscutellum, front and middle legs, and apical 0.25± and apical part of dorsal edge of hind femur, pale yellow; flagellum brown beneath; side of thorax except for front part of prothorax, disc of scutellum, often most of mesoscutum, tinge on front and middle femora, hind coxa and trochanters, and hind femur except as described otherwise, fulvous; extreme apex of hind femur infuscate; hind tibia whitish, its basal and apical 0.16± fuscous; hind tarsus whitish, its last tarsal segment brownish apically. In two specimens from Juneau, Alaska, the hind femur is almost entirely fulvous, with only a very small area of yellow at the apex above.

This subspecies is intermediate between the Palaearctic subspecies *decoratus* and the subspecies *scitulus* from eastern North America.

Type: ♀, Parker Creek, Sierra Ancha, Ariz., May 7, 1947, H. and M. Townes (Washington, USNM 63681).

Paratypes: 2♀, bred from *Acleris variana*, Juneau, Alaska, September 1953, W. F. Cambridge (Washington). ♀, Oak Creek Canyon, Ariz., May 20, 1947, H. and M. Townes (Townes). ♀, Canim Lake, B. C., June 22, 1938, G. S. Walley (Ottawa). ♀, Robson, B. C.,



FIGURES 160–162.—Localities: 160 (left), *Exochus decoratus hebes;* 161 (center), *E. decoratus scitulus;* 162 (right), *E. mandibularis.*

Aug. 15 to 31, 1947, H. R. Foxlee (Ottawa). ♀, Robson, B. C., Oct. 7, 1938, H. R. Foxlee (Townes). ♀, bred from *A. variana*, Skeena Crossing, B. C., Aug. 3, 1939 (Ottawa). ♀, Indian Meadows, La Poudre River, Colo., Aug. 13, 1952, R. R. Dreisbach (Dreisbach).

This subspecies occurs in the Rocky Mountains and westward, in the Transition and Canadian zones.

54c. Exochus decoratus scitulus Provancher, new status

FIGURES 179,o; 196,h

Exochus scitulus Provancher, 1877, Naturaliste Canadien, vol. 9, p. 15; [♀]. Type: ♀, Quebec (Quebec).

Front wing 4.4 to 7.0 mm. long; costula usually incomplete.

Black. Face (except for large subcentral rectangular fuscous area in male), side of frons (narrowed above), connecting spot at top of eye, clypeus, cheek, lower 0.55± of temple, mouth parts, scape and pedicel beneath, scutellum except for a median basal fulvous area, and postscutellum, pale yellow; ventral, posterior, and upper hind parts of pronotum, whitish; propleurum except above, tegula, subtegular ridge, most of prepectus and connecting discal area on mesopleurum, and mesopleurum next to socket of middle coxa, whitish; legs whitish, the hind coxa and trochanters and basal 0.6 or less of hind femur fulvous, basal and apical 0.14± of hind tibia fuscous, extreme apex of hind femur and a dorsal apical area on middle tibia of female infuscate, and apex of last segment of hind tarsus brownish; upper part of thorax more or less blackish, the rest of thorax fulvous except where described as pale yellow or whitish.

Specimens (40♂, 34♀): From Connecticut (South Meriden and Voluntown); Georgia (Black Rock Mt. in Rabun Co. at 3,500 ft.); Illinois (White Heath); Kansas (Riley Co.); Maine (Augusta, Casco, Echo Lake on Mount Desert, Orland, and Starks); Maryland (Bowie and Takoma Park); Massachusetts (Cheshire and North Adams); Michigan (Midland Co.); Minnesota (Itasca State Park); New Hampshire (Mount Madison, Randolph, and Mount Washington); New Jersey (Milltown and Moorestown); New York (Cold Spring Harbor, Farmingdale, Ithaca, Oneonta, and Poughkeepsie); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft. and Mount Pisgah at 4,800 to 5,300 ft.); Nova Scotia (Jaffrey and Kings Co.); Ontario (Lisle); Pennsylvania (Valley Forge and Spring Brook); Quebec (Georgeville and Stoneham); and Rhode Island (Westerly).

Most collection dates are from mid-June to mid-August. Those outside of this range are: "May 20 to 25" on Black Mt. at 3,500 ft., Rabun Co., Ga.; June 2 at Ithaca, N. Y.; June 6 at Moorestown, N. J.; June 7 at Jaffrey, N. S.; June 8 at Westerly, R. I.; August 24 at Oneonta, N. Y.; August 25 at Crabtree Meadows, 3,600 ft., Yancey Co., N. C.; August 27 at White Heath, Ill.; and "Sept." in Itasca State Park, Minn.

Reared specimens are as follows: 2♂, from *Acleris variana*, Lisle, Ont., July 25 and 26, 1938; ♂, from *Argyrotaenia* on *Abies*, emerged May 1, 1951; and ♀, from tortricid on *Abies*, Starks, Maine, collected July 15, 1946, emerged Aug. 22, 1946.

We have collected the subspecies only in the undergrowth of moist woods. When captured, specimens give off a strong odor like species of *Coccygomimus*.

This subspecies is in the Alleghenian and Carolinian faunas, in moist woods. Adults occur through the summer.

55. Exochus mandibularis Cushman

FIGURE 196,i

Exochus mandibularis Cushman, 1922. Proc. U. S. Nat. Mus., vol. 61, art. 8, p. 13; "♂"=♀. Type: ♀, Alpine Region of Mount Washington, N. H. (Washington).

Male: Unknown.

Female: Front wing 3.7 to 3.9 mm. long; costula incomplete; second lateral area of propodeum about 1.55 as long as wide; second tergite about 0.9 as long as wide, with about 100 to 150 hairs.

Black. Face, side of frons (narrowed above), large spot at top of eye, clypeus, cheek, lower 0.3 of temple, mouth parts, under side of scape and pedicel, hind corner of pronotum, tegula, spot on prepectus, apex and side of scutellum, front and middle legs, apical 0.2 and apical part of upper edge of hind femur, hind tibia except at base and apex, and hind tarsus except at apex, whitish or ivory; disc and basal part of scutellum black to ferruginous; postscutellum ferruginous to ivory; mesosterum sometimes ferruginous; metapleurum ferruginous, paler posteriorly; basal and apical 0.12 of hind tibia fuscous; apical half of last segment of hind tarsus brown; hind leg fulvous except as described otherwise.

Specimens: 4♀, Isle Royale, Mich., Aug. 3 to 7, 1936, C. W. Sabrosky (Washington and Townes). ♀ (type), Alpine Region of Mount Washington, N. H., A. T. Slosson (Washington). ♀, Randolph, N. H., July 4, 1946, J. Peck and M. Townes (Townes).

XII. SPECIES INQUIRENDA

56. Exochus albiceps Walsh

Exochus albiceps Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 96; ♂. Type: ♂, ? Illinois (destroyed in Chicago fire of 1871).

This species is known only from its original description, which was drawn from a very small species with areolated propodeum, of the general coloration of *Exochus atriceps atriceps* and of *E. russeus*. It does not agree with any of the specimens at hand. Possibly future collectors will find the species again. The original description is reproduced below.

"♂.—Differs from the above [*Exochus atriceps atriceps*] only as follows: 1. The head is white, except a black spot just enclosing the ocelli and a large lunate black spot on the occiput, medially confluent with the other one by a short space. Face, except the orbits, tinged with rufous. 2. The 1st. joint of the flagellum is only twice as long as wide, the 2nd. only ¼ longer than wide, and the following joints square. 3. The thorax is glabrous and polished, and the carinae on the metathorax are all distinct as in [*Exochus*] *albifrons*. The white markings are rufescent and less distinct, and the only black markings are a short line inside origin of the front wing, an indistinct vitta on the disc of the lateral lobe of the mesonotum, and a large spot at the tip of its middle lobe. 4. The first joint of the abdomen is immaculate, ½ longer than wide, and twice as wide behind as before, its 2 carinae reaching half way to the tip. An obtrigonate, dorsal spot at the tip of joint 5 and the whole of 6–8, black. 5. The legs are all dull luteous, with an abbreviated, exterior vitta on each femur, and an unabbreviated one on each tibia. Length ♂ .18 inch. Front wing ♂ .15 inch.

"One ♂; ♀ unknown to me. Distinct from all Mr. Cresson's species by its rufous abdomen, etc."

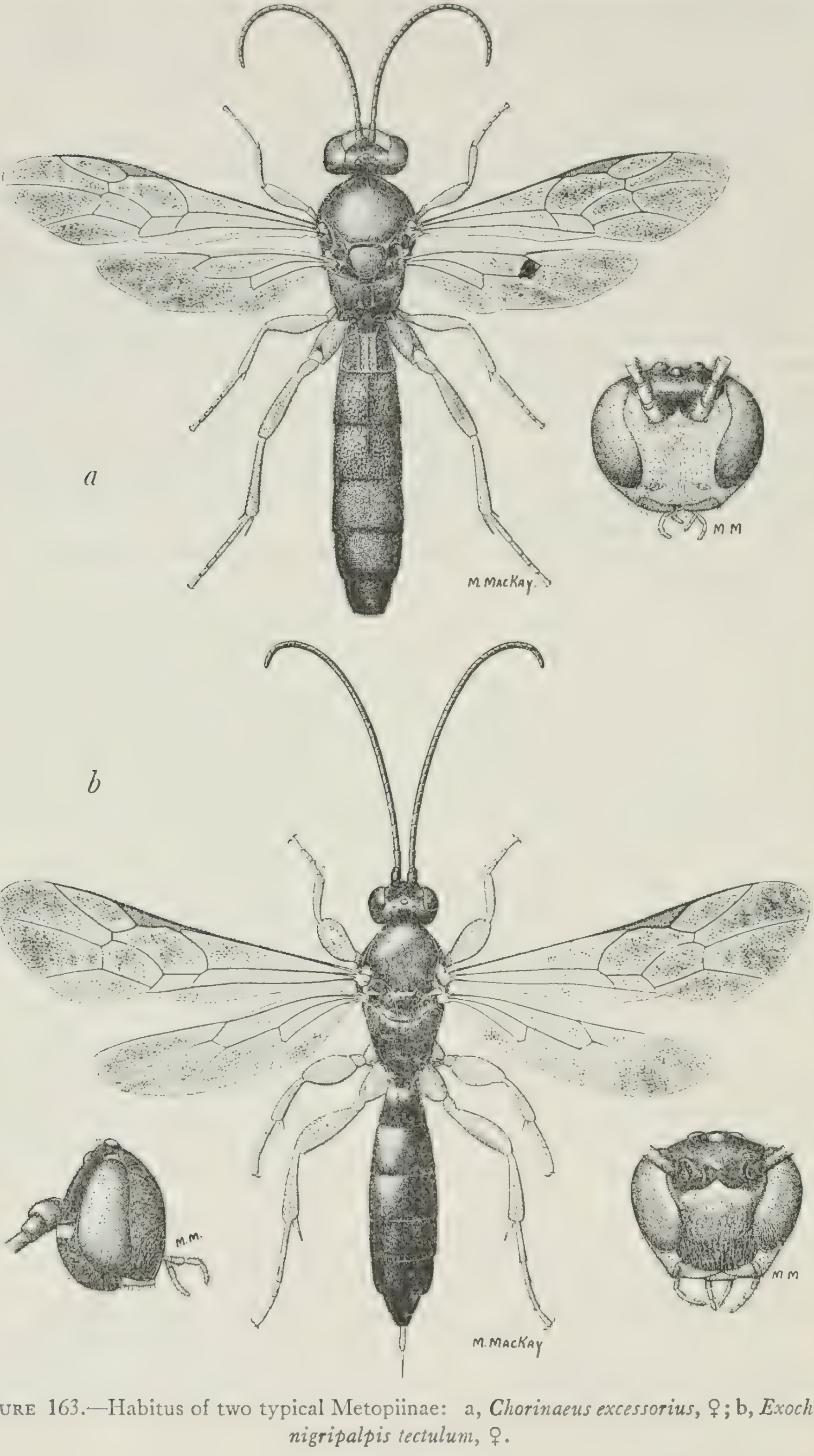

a
M MACKAY
MM
b
M.M.
MM
M. MACKAY

FIGURE 163.—Habitus of two typical Metopiinae: a, *Chorinaeus excessorius*, ♀; b, *Exochus nigripalpis tectulum*, ♀.

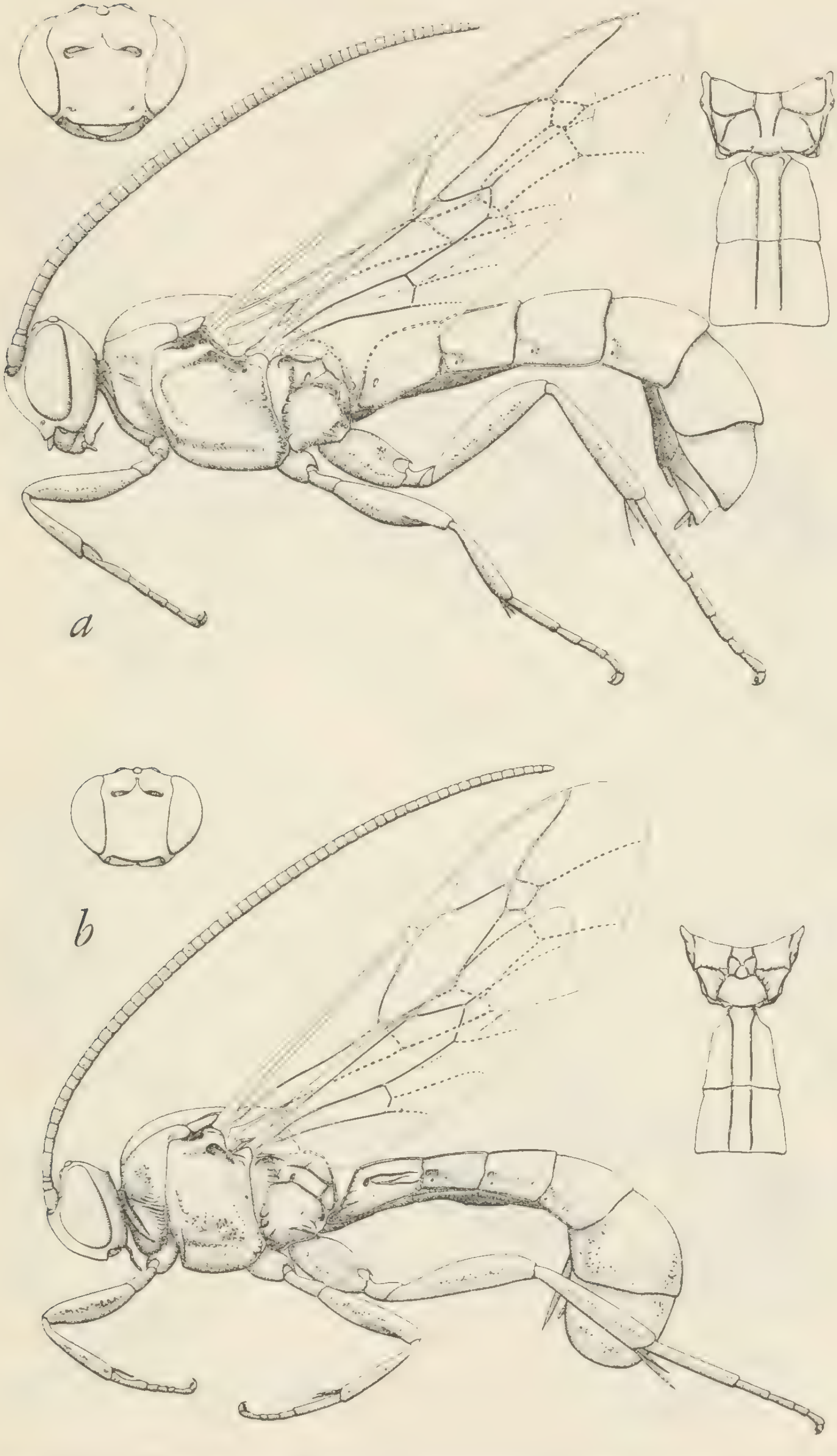


FIGURE 164.—a, *Pseudometopius hagenii*, ♀, genotype of *Pseudometopius;* b, *Acerataspis clavata*, ♀, genotype of *Acerataspis.*

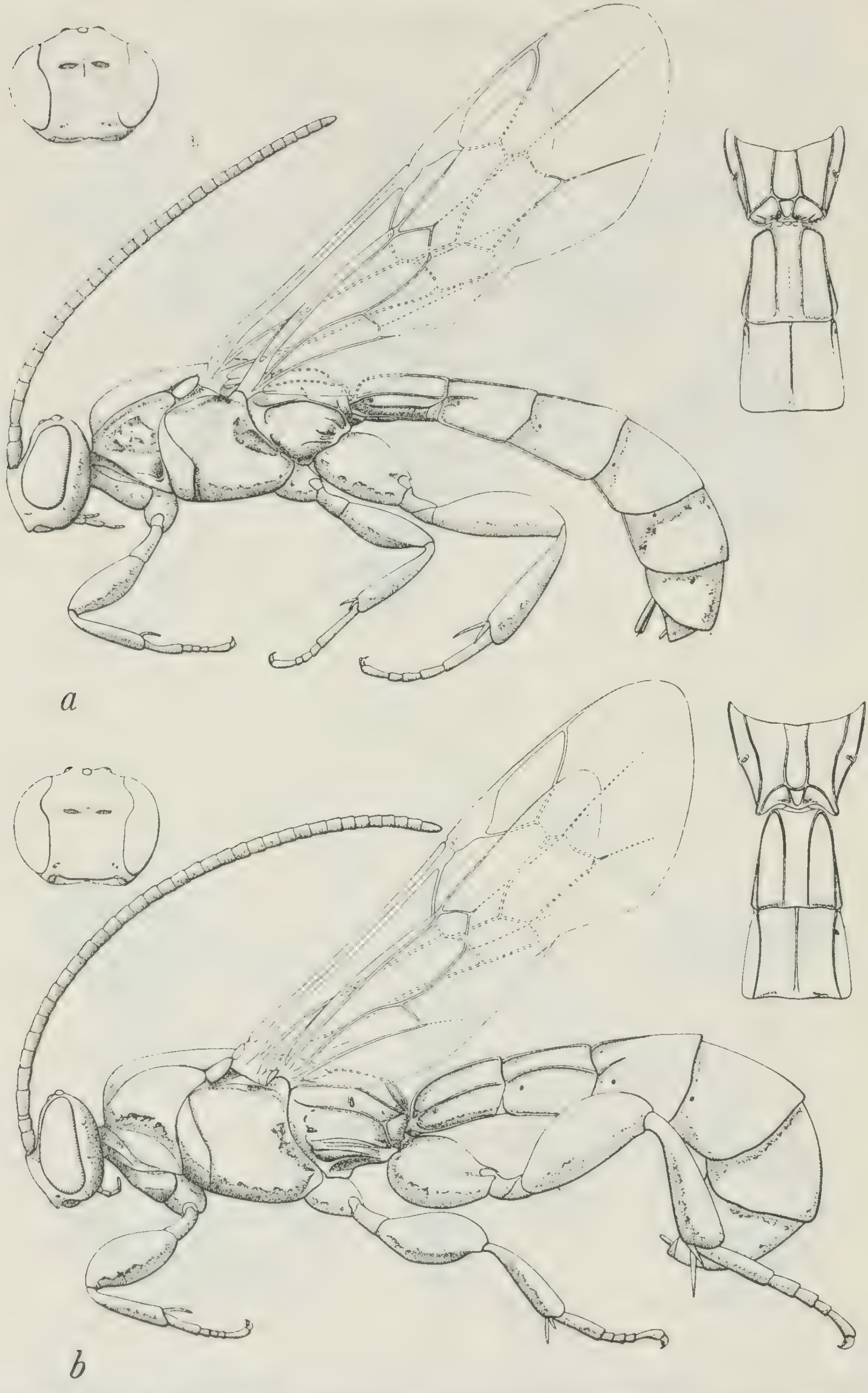


FIGURE 165.—a, *Chorinaeus funebris*, ♀, genotype of *Chorinaeus;* b, *Trieces texanus*, ♀, genotype of *Trieces.*

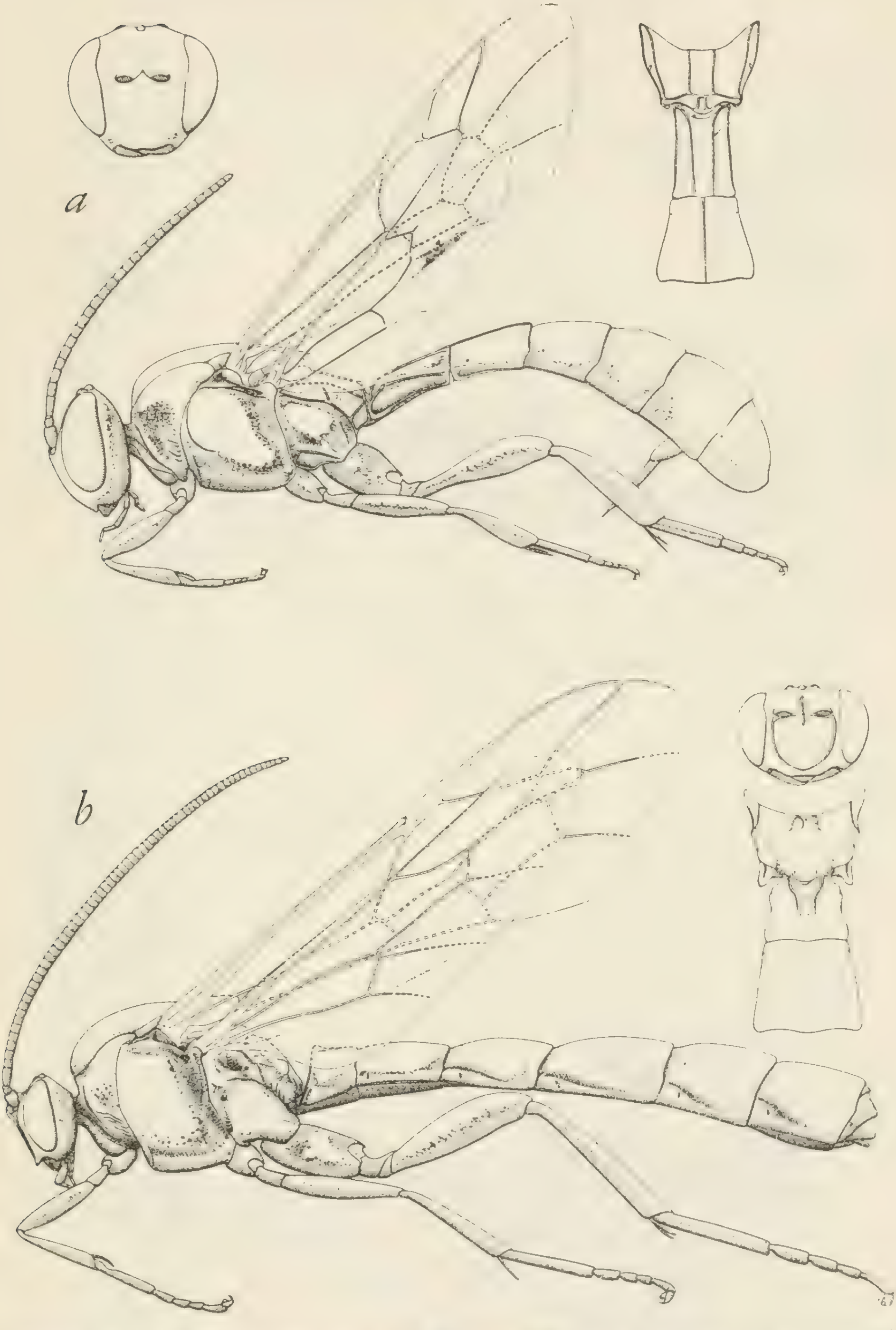


Figure 166.—a, *Hemimetopius*, sp., ♀; b, *Metopius* (*Peltocarus*) *dentatus*, ♀, genotype of *M*. (*Peltocarus*).

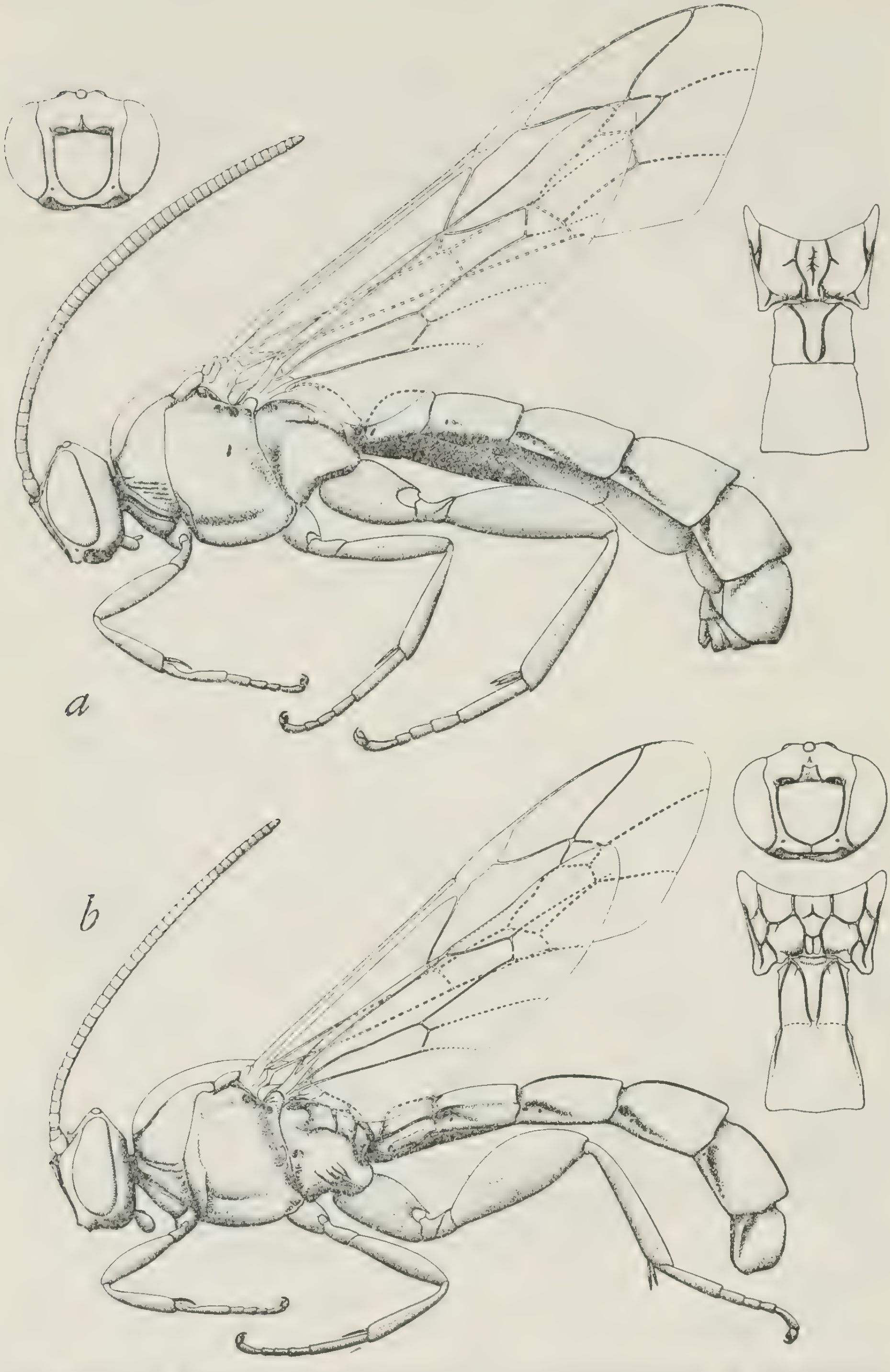


FIGURE 167.—a, *Metopius (Metopius) mimicus*, ♀, a typical species of *M. (Metopius)*; b, *M. (Peltales) errantius*, ♀, genotype of *M. (Peltales)*.

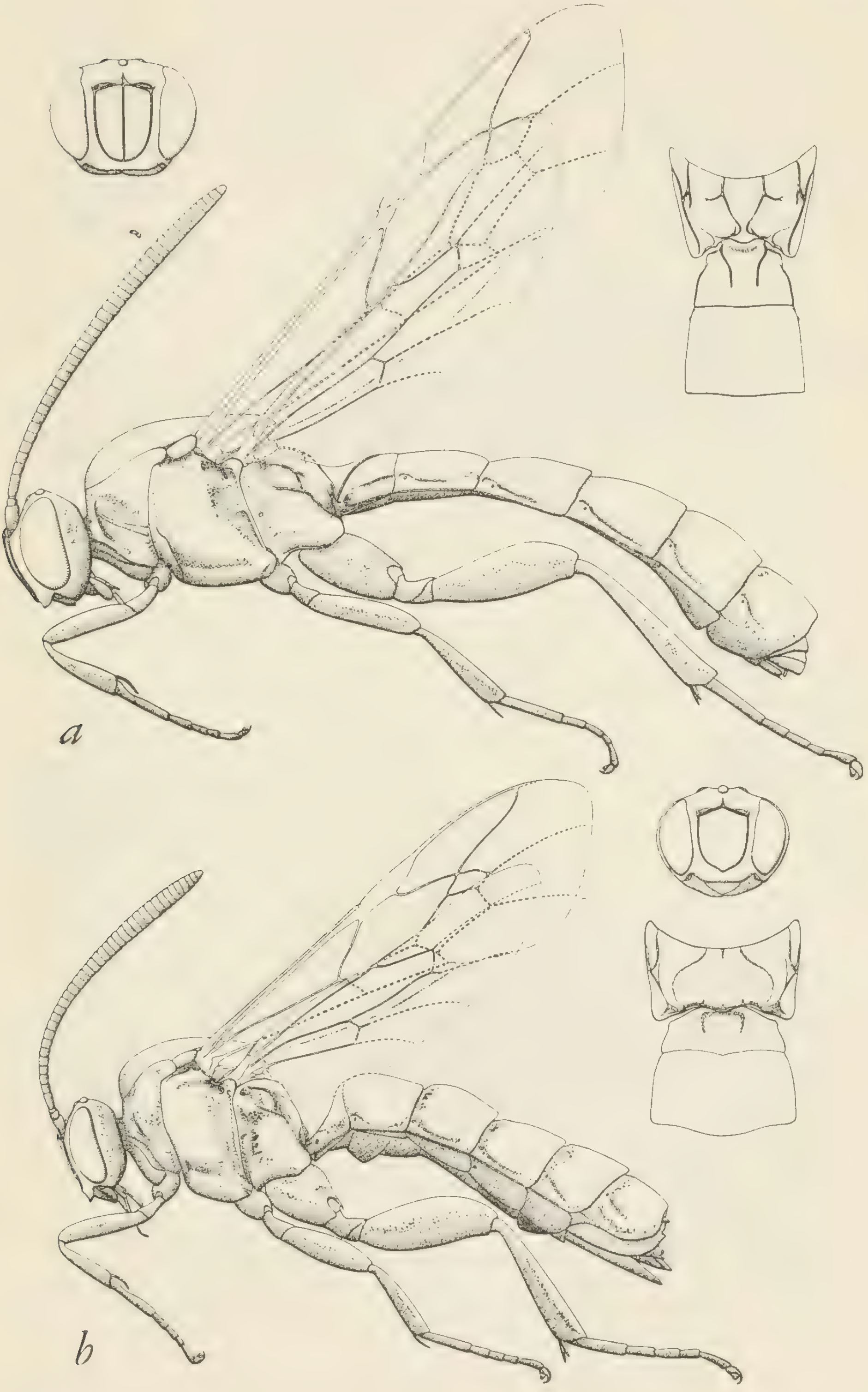


FIGURE 168.—a, *Metopius* (*Cultrarius*) *ultimatus*, ♀, a typical species of *M.* (*Cultrarius*); b, *M.* (*C.*) *rileyi*, ♀, genotype of *M.* (*Cultrarius*).

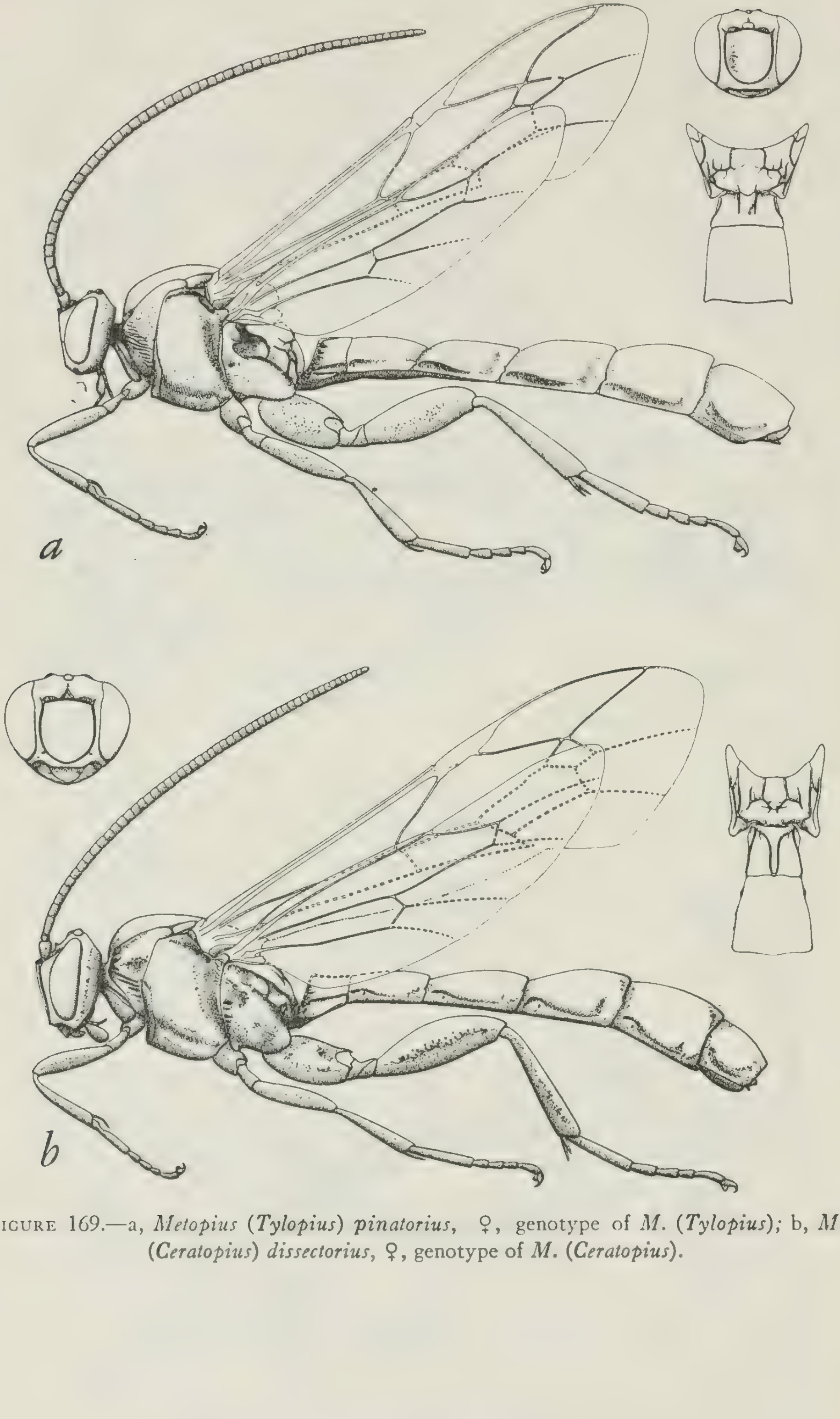


FIGURE 169.—a, *Metopius* (*Tylopius*) *pinatorius*, ♀, genotype of *M.* (*Tylopius*); b, *M.* (*Ceratopius*) *dissectorius*, ♀, genotype of *M.* (*Ceratopius*).

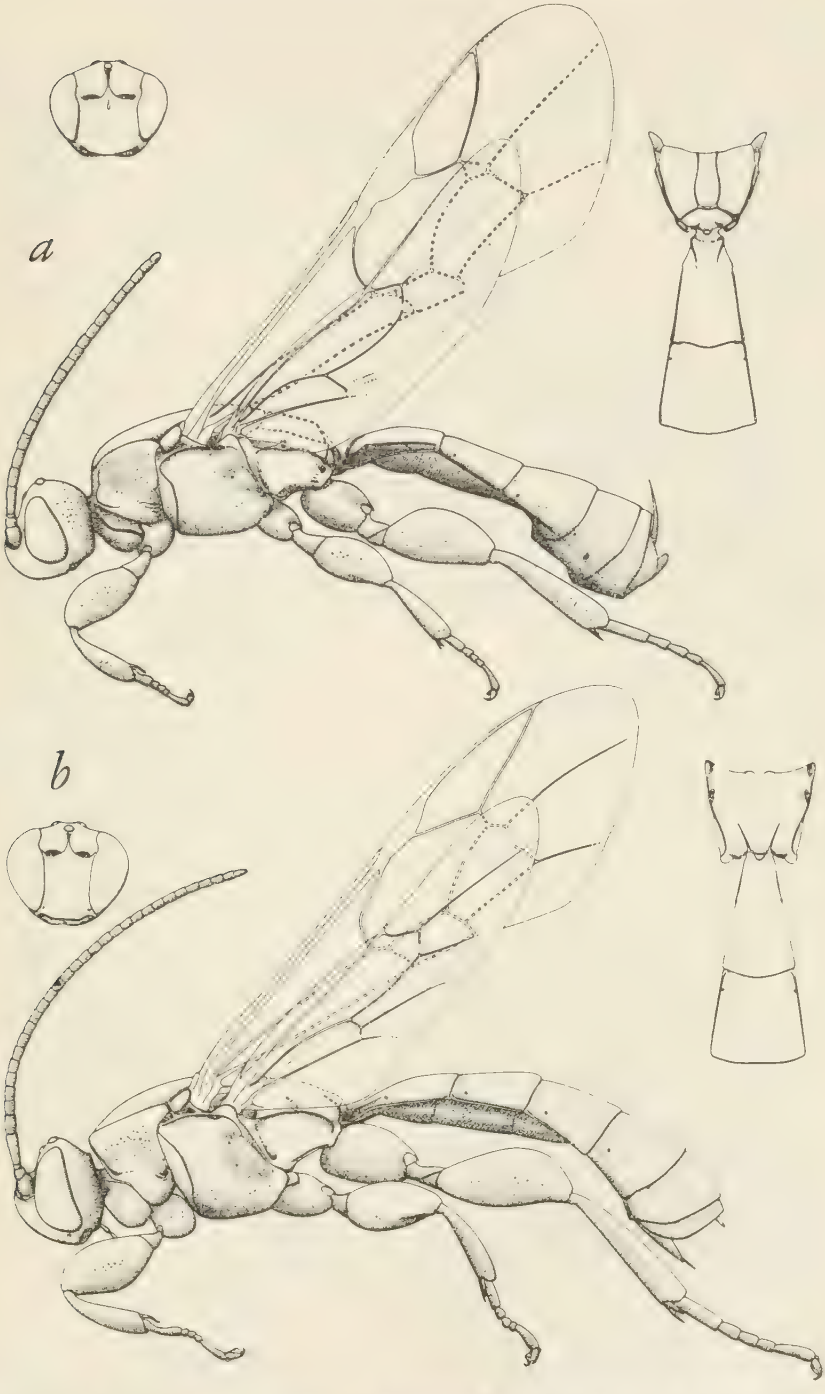


FIGURE 170.—a, *Triclistus podagricus*, ♀, genotype of *Triclistus;* b, a typical species of *Cubus*, ♀.

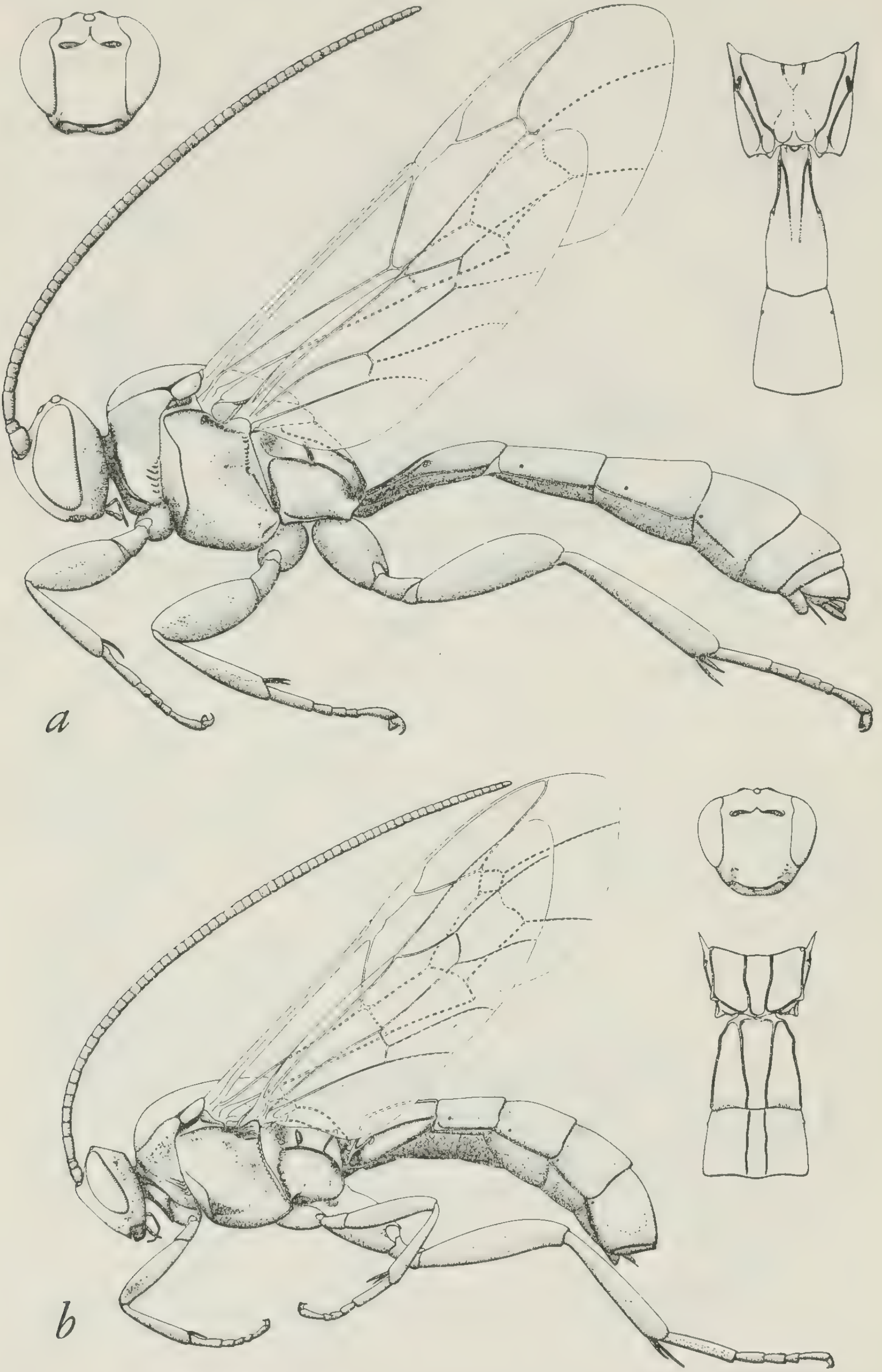


FIGURE 171.—a, *Colpotrochia elegans*, ♀, genotype of *Colpotrochia;* b, *Spudaeus scaber*, ♀, genotype of *Spudaeus*.

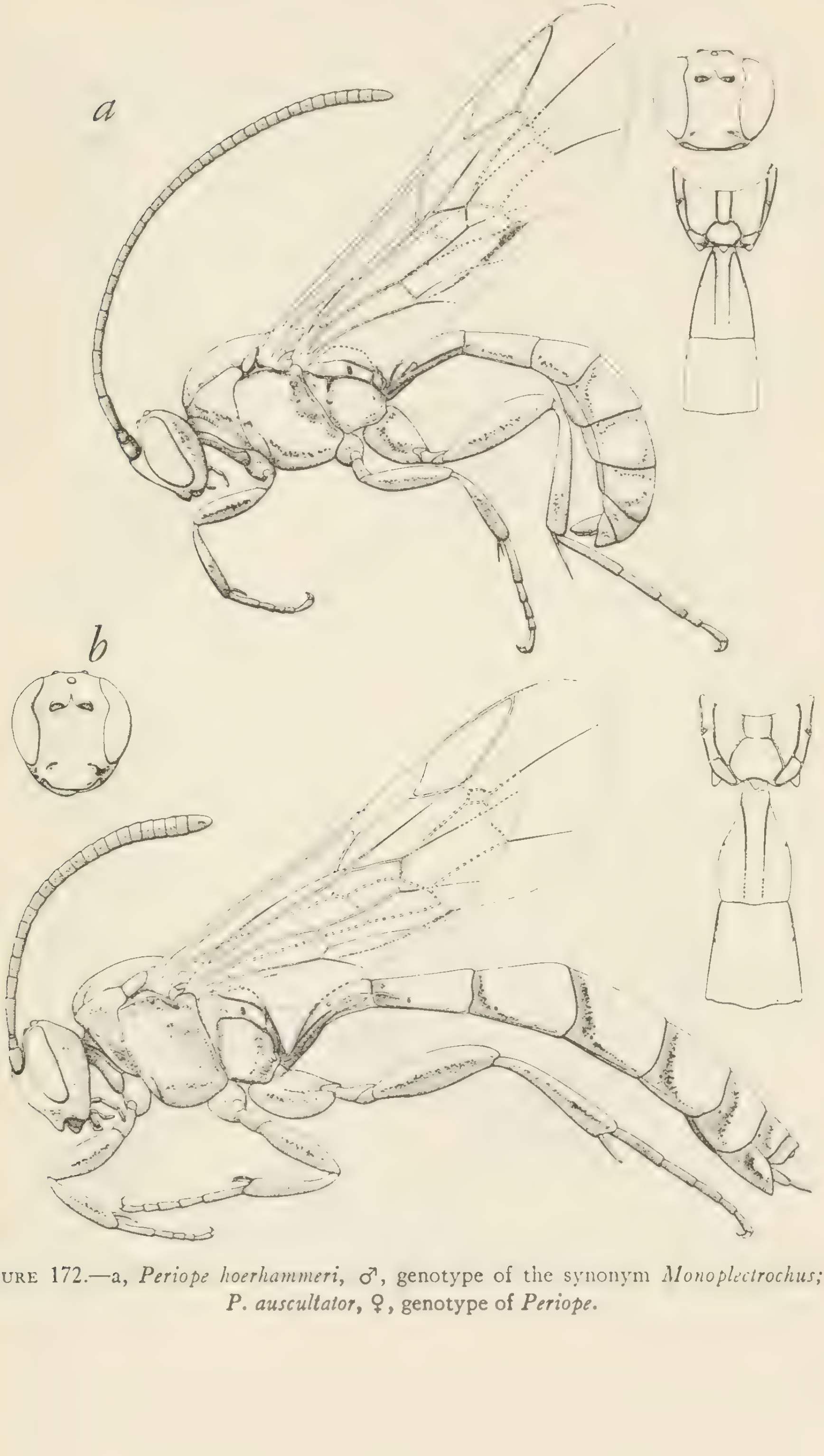


FIGURE 172.—a, *Periope hoerhammeri*, ♂, genotype of the synonym *Monoplectrochus;* b, *P. auscultator*, ♀, genotype of *Periope*.

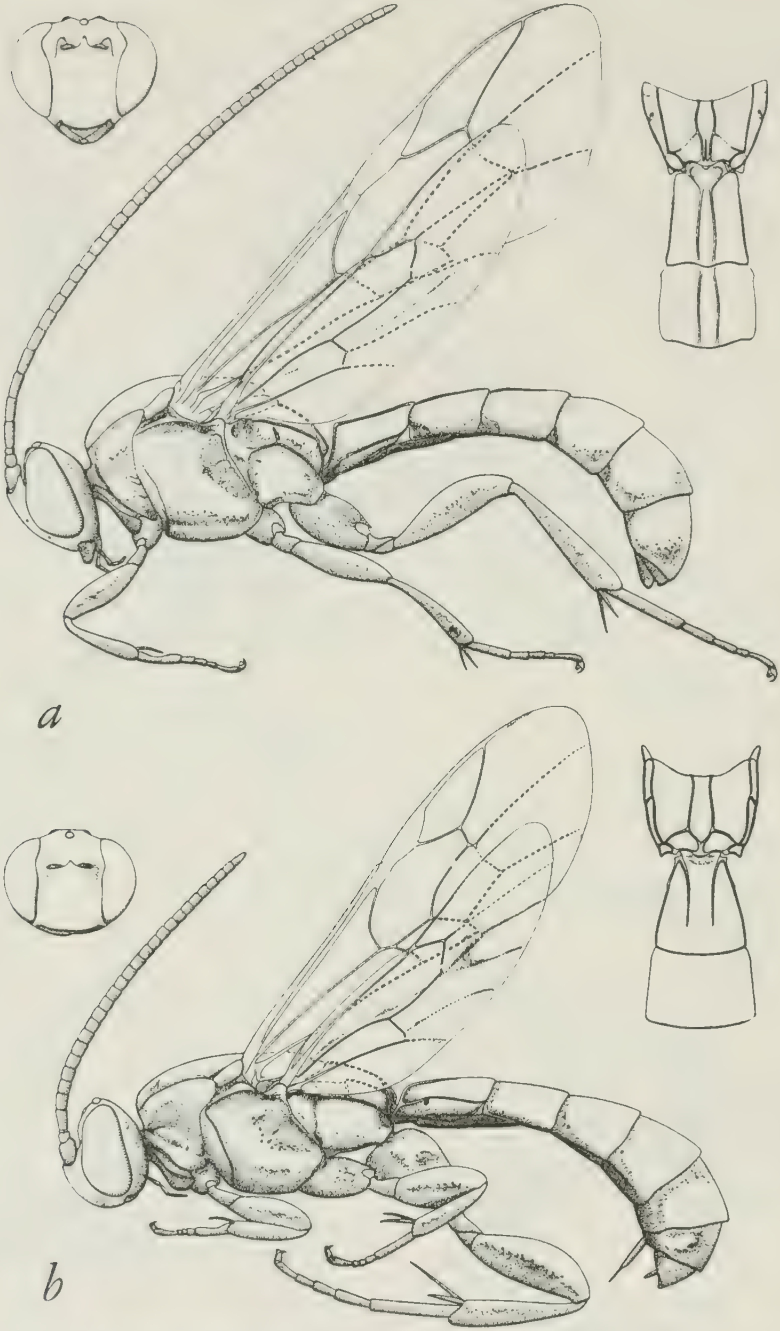


Figure 173.—a, A Species of *Drepanoctonus*, ♀; b, *Leurus caeruliventris*, ♀, genotype of *Leurus*.

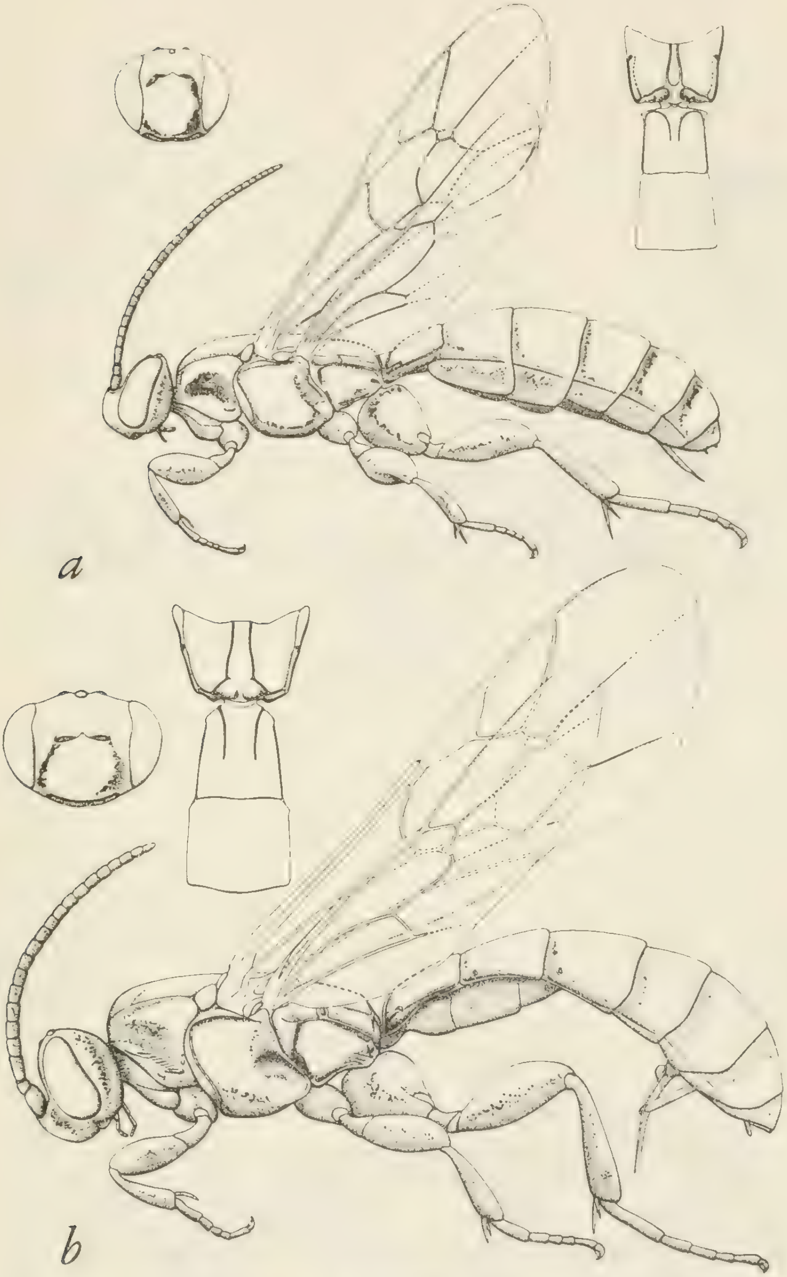


FIGURE 174.—a, *Seticornuta terminalis*, ♀, representative of *Seticornuta;* b, *Carria dreisbachi*, ♀, representative of *Carria*.

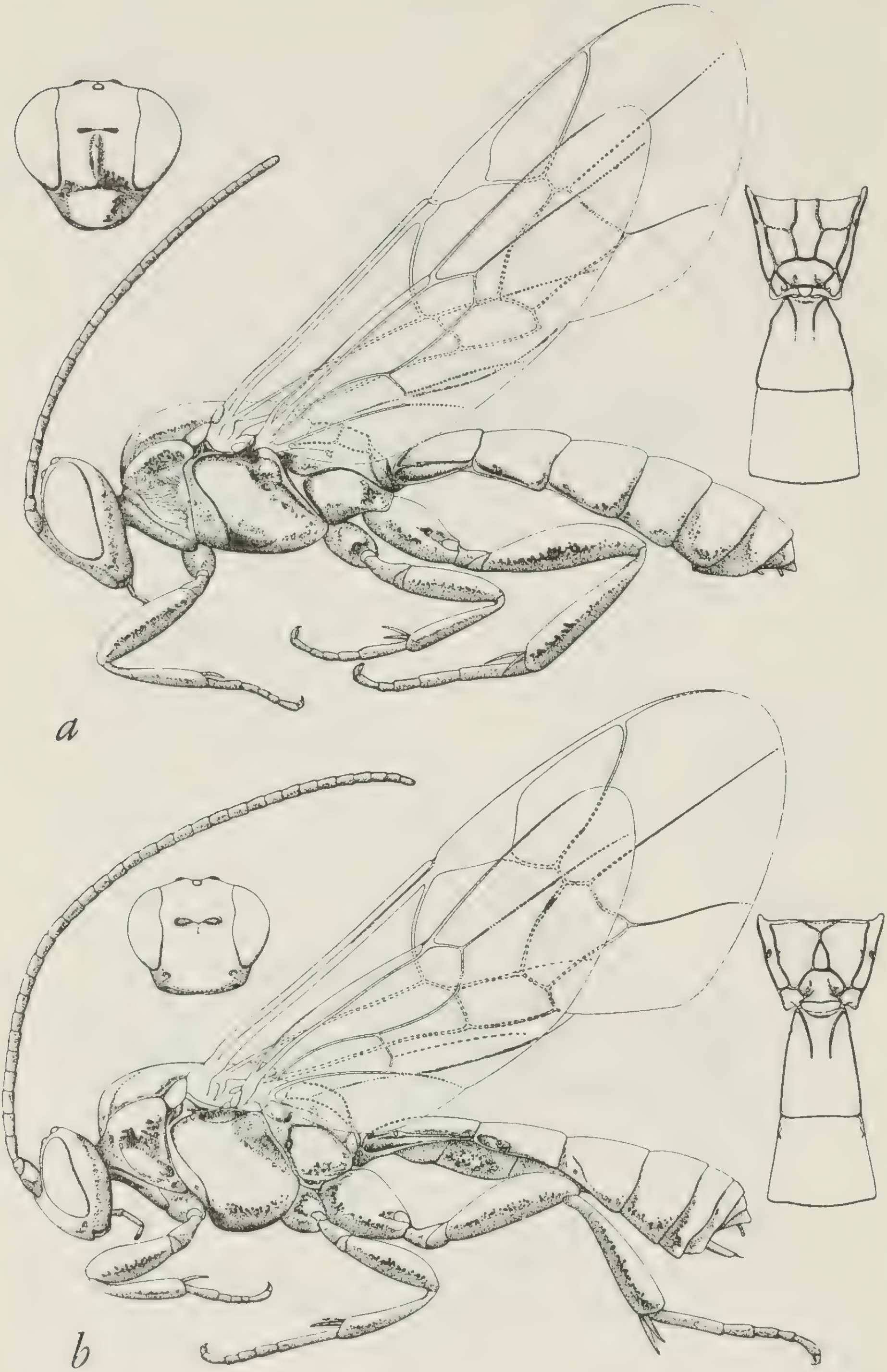


FIGURE 175.—a, *Macromalon montanum*, ♀, genotype of *Macromalon;* b, *Synosis clepsydra*, ♀, genotype of *Synosis.*

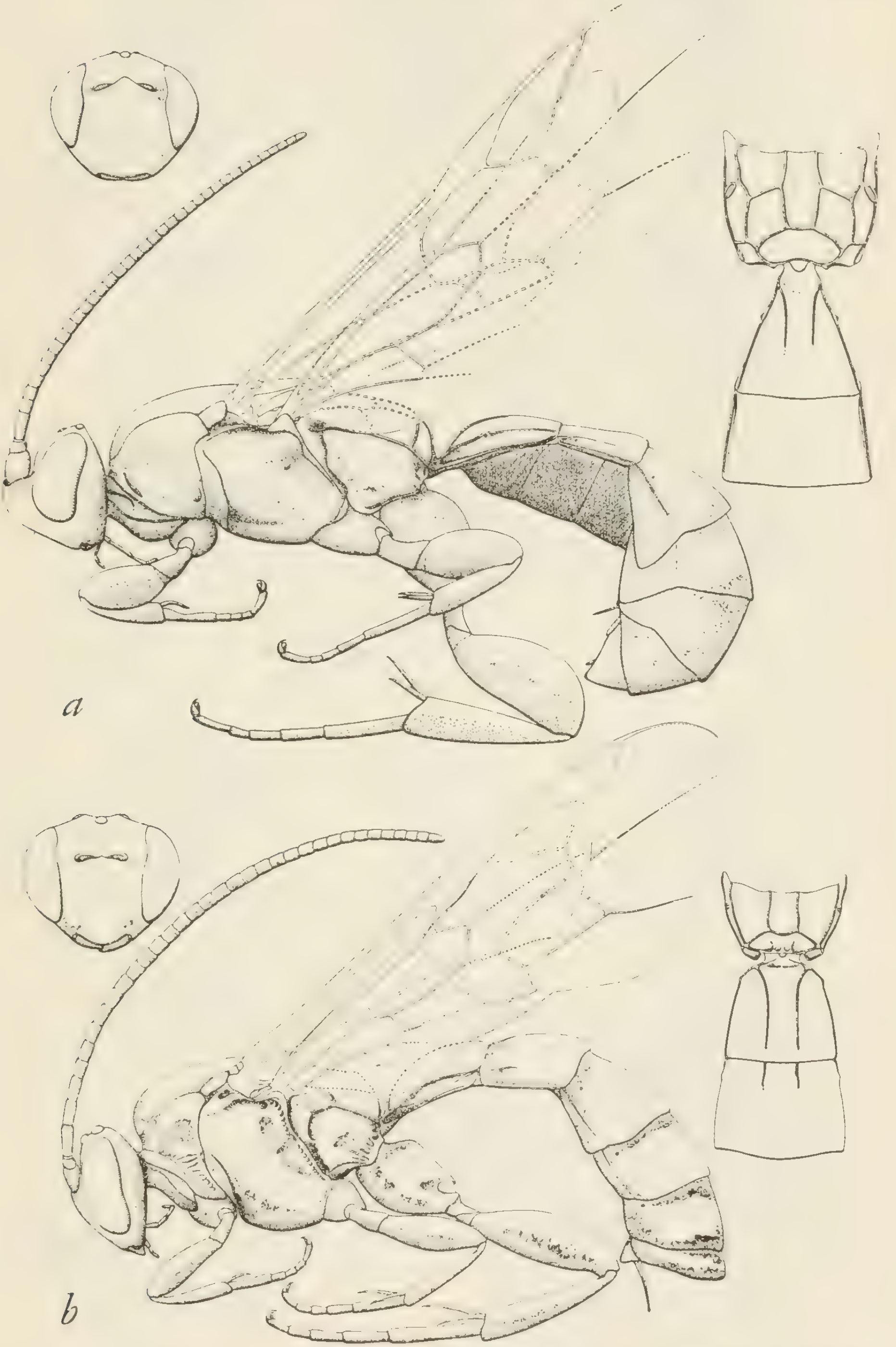


Figure 176.—a, *Hypsicera femoralis*, ♀, genotype of *Hypsicera;* b, *Bothromus minoris*, ♀, genotype of *Bothromus.*

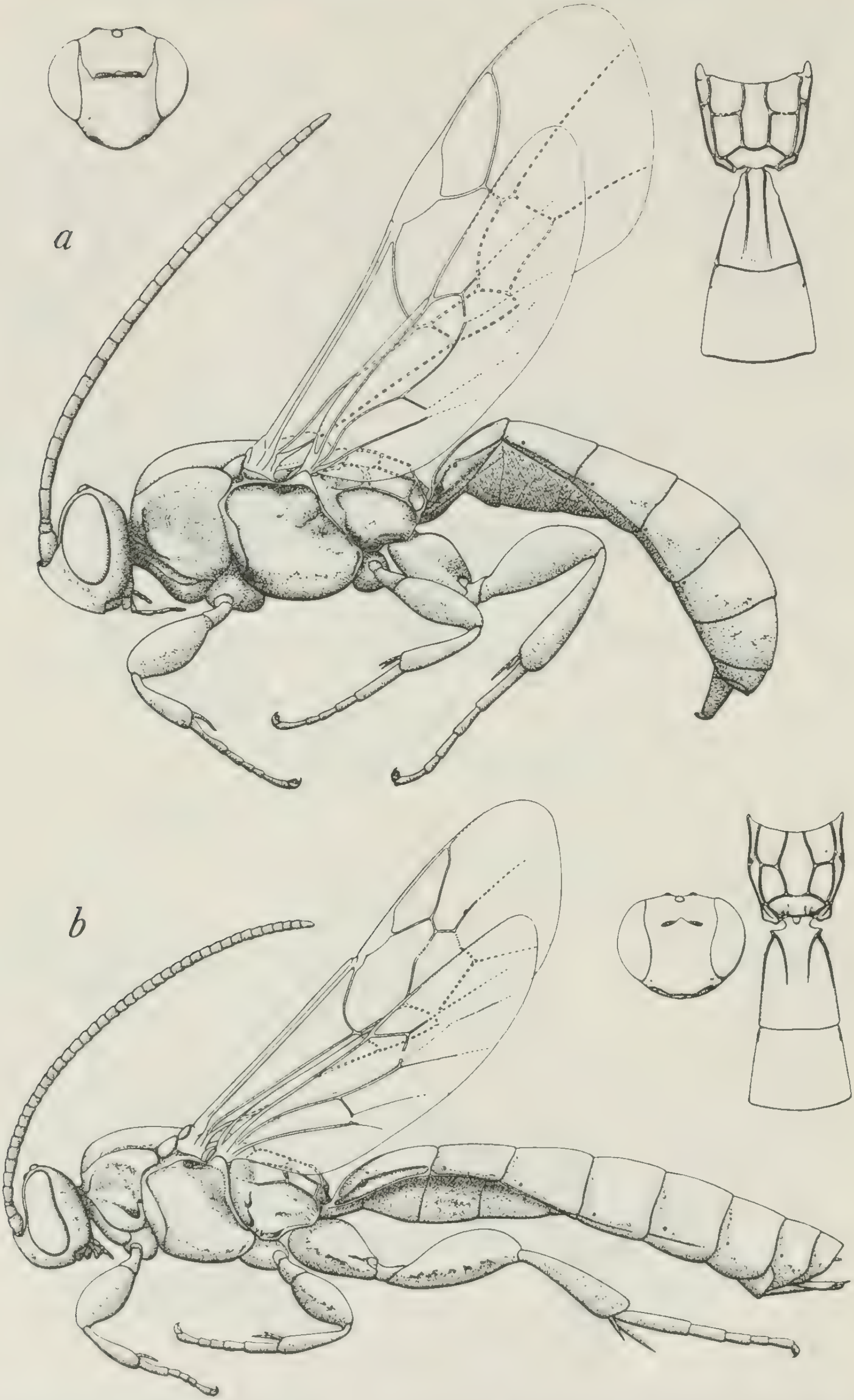


Figure 177.—a, *Stethoncus arcticus*, ♀, genotype of *Stethoncus;* b, *Exochus gravipes*, ♀, genotype of *Exochus*.

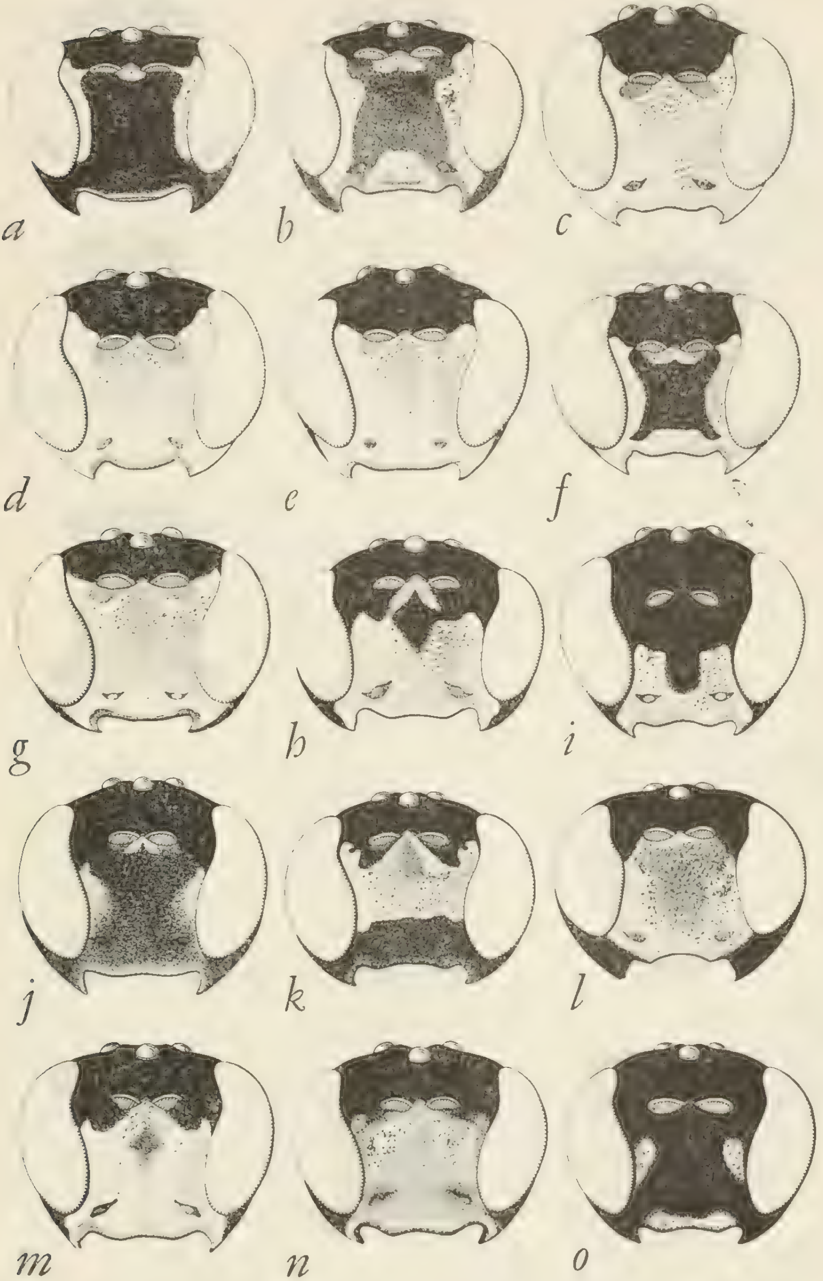


FIGURE 178.—Heads: a–l, species of *Chorinaeus*, ♀; m–o, species of *Trieces*, ♀:

a, *C. longicalar pleturus*
b, *C. longicalar pleturus*
c, *C. aequalis*
d, *C. excessorius*
e, *C. californicus*
f, *C. opacitas*
g, *C. constrictus*
h, *C. funebris carinatus*
i, *C. funebris divisus*
j, *C. recurvus*
k, *C. labiosus*
l, *C. emorsus*
m, *T. costatus*
n, *T. flavifrons*
o, *T. teres*

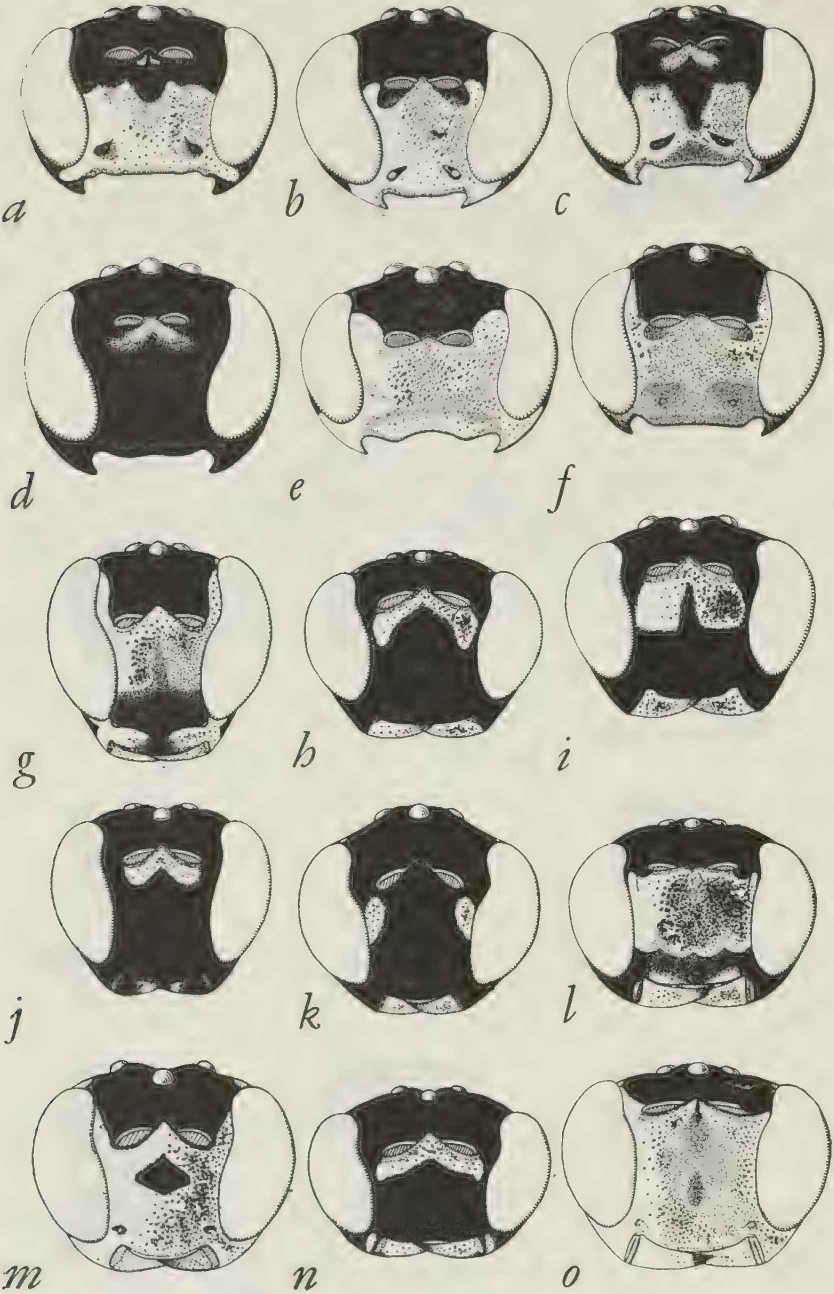


FIGURE 179.—Heads: a–e, species of *Trieces*, ♀; f, species of *Seticornuta*, ♀; g–o, species of *Exochus*, ♀ (except where noted):

a, *T. tegularis*
b, *T. sapineus sapineus*
c, *T. sapineus litus*
d, *T. aquilus*
e, *T. onitis*
f, *S. terminalis*
g, *E. pictus xanthopsis*
h, *E. litus*
i, *E. flavifrontalis*, ♂
j, *E. nigripalpis tectulum*
k, *E. externus*
l, *E. capnodes*, ♂
m, *E. signifer*
n, *E. transversus*
o, *E. decoratus scitulus*, ♂

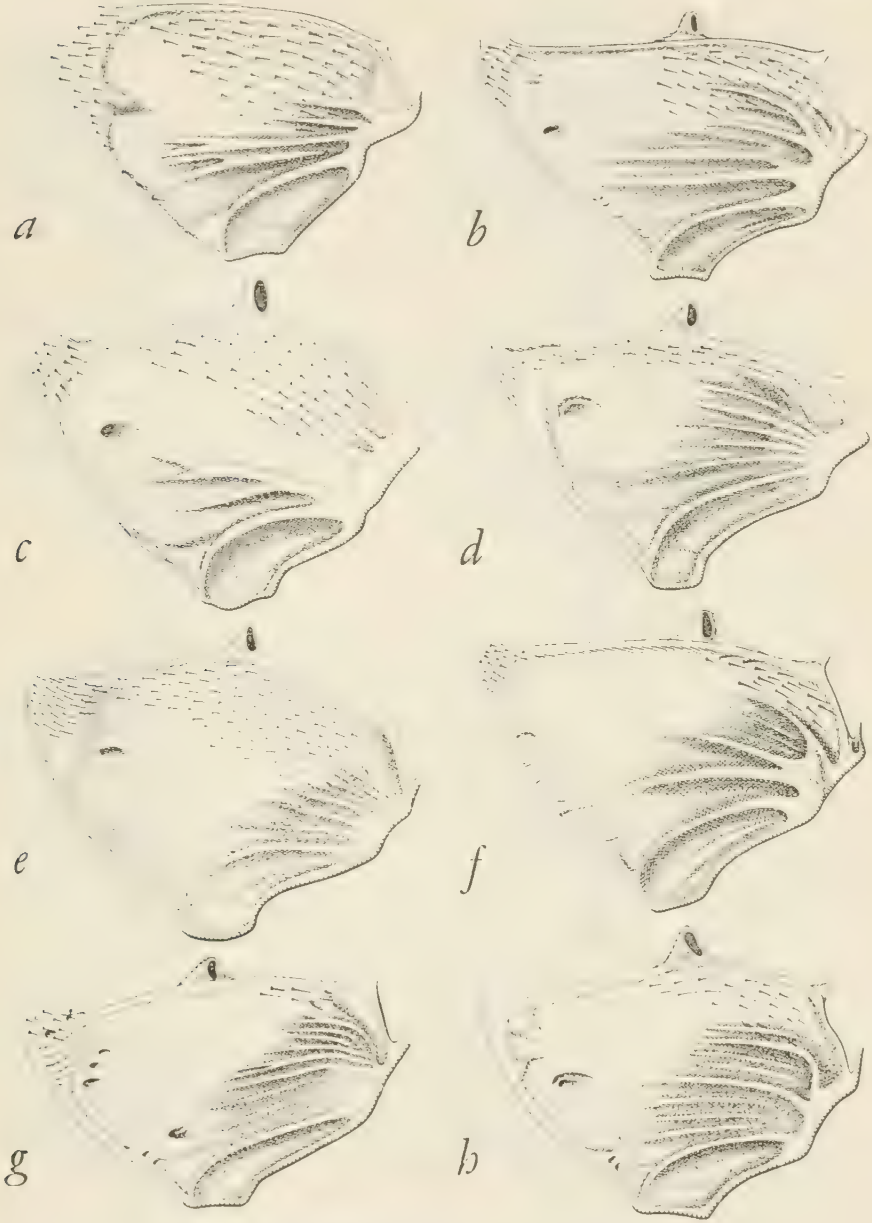


FIGURE 180.—Metapleura of species of *Trieces*, ♀:

a, *masoni*
b, *costatus*
c, *flavifrons*
d, *tegularis*
e, *teres*
f, *densus*
g, *sapineus sapineus*
h, *texanus*

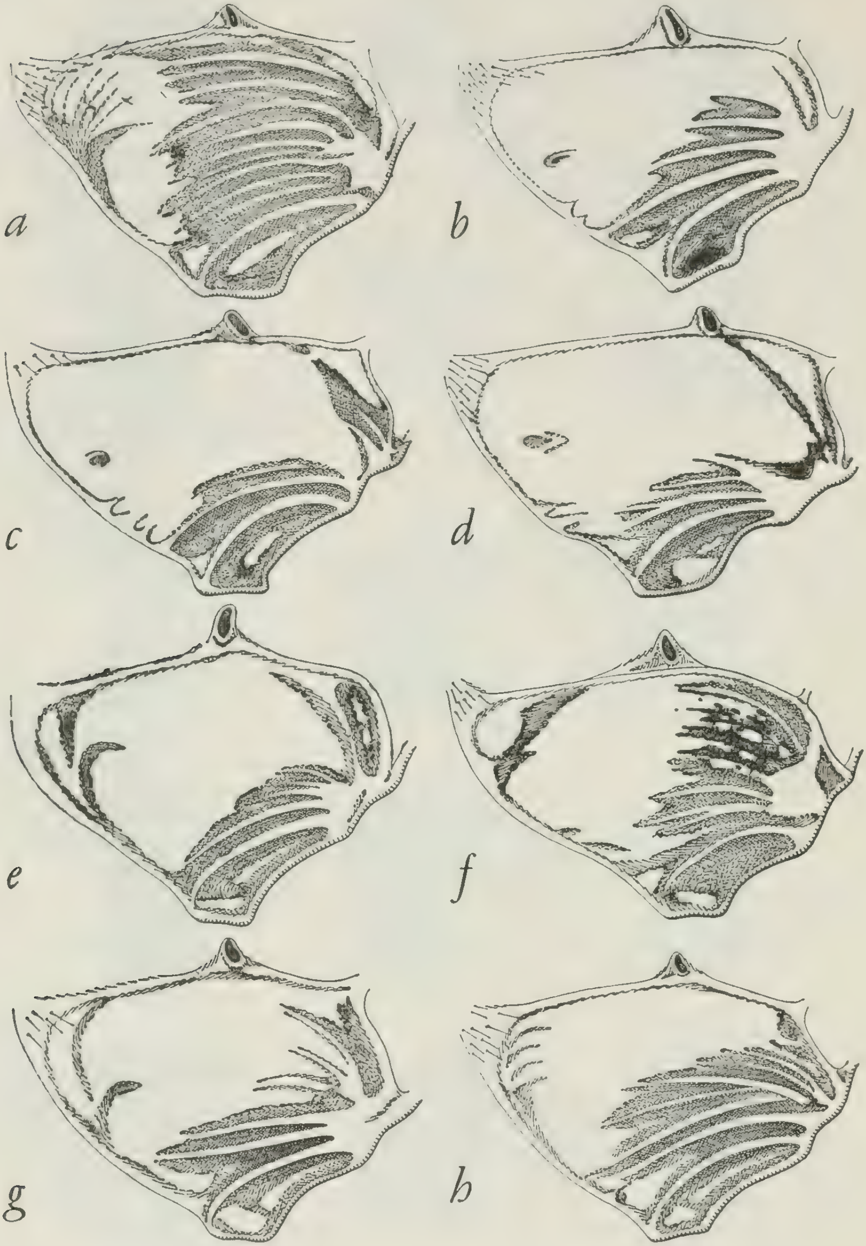


Figure 181.—Metapleura of species of *Trieces*, ♀ (except where noted):

a, *ejectus*, ♂
b, *walleyi*
c, *integer*
d, *fusus*
e, *aquilus*
f, *sparsus*
g, *marlatti*
h, *bradleyi*

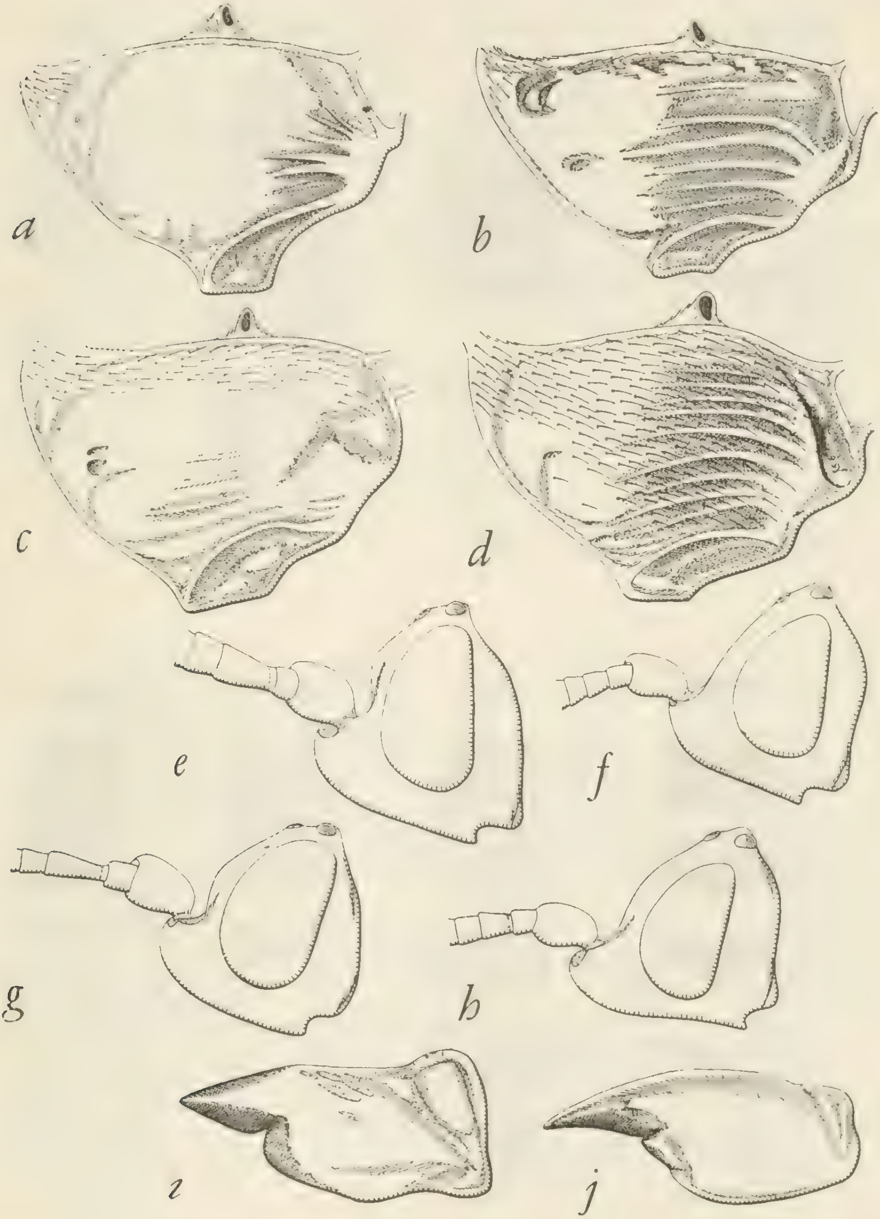


FIGURE 182.—a–d, Metapleura of species of *Trieces*, ♀; e–h, heads of species of *Hypsicera*, ♀; i, j, mandibles of species of *Carria*, ♀:

a, *T. ciliosus*
b, *T. calvatus*
c, *T. dentatus*
d, *T. arcuatus*
e, *H. femoralis*
f, *H. curvator*
g, *H. fulviceps*
h, *H. cuneata opaca*
i, *C. dreisbachi dreisbachi*
j, *C. inculcata*

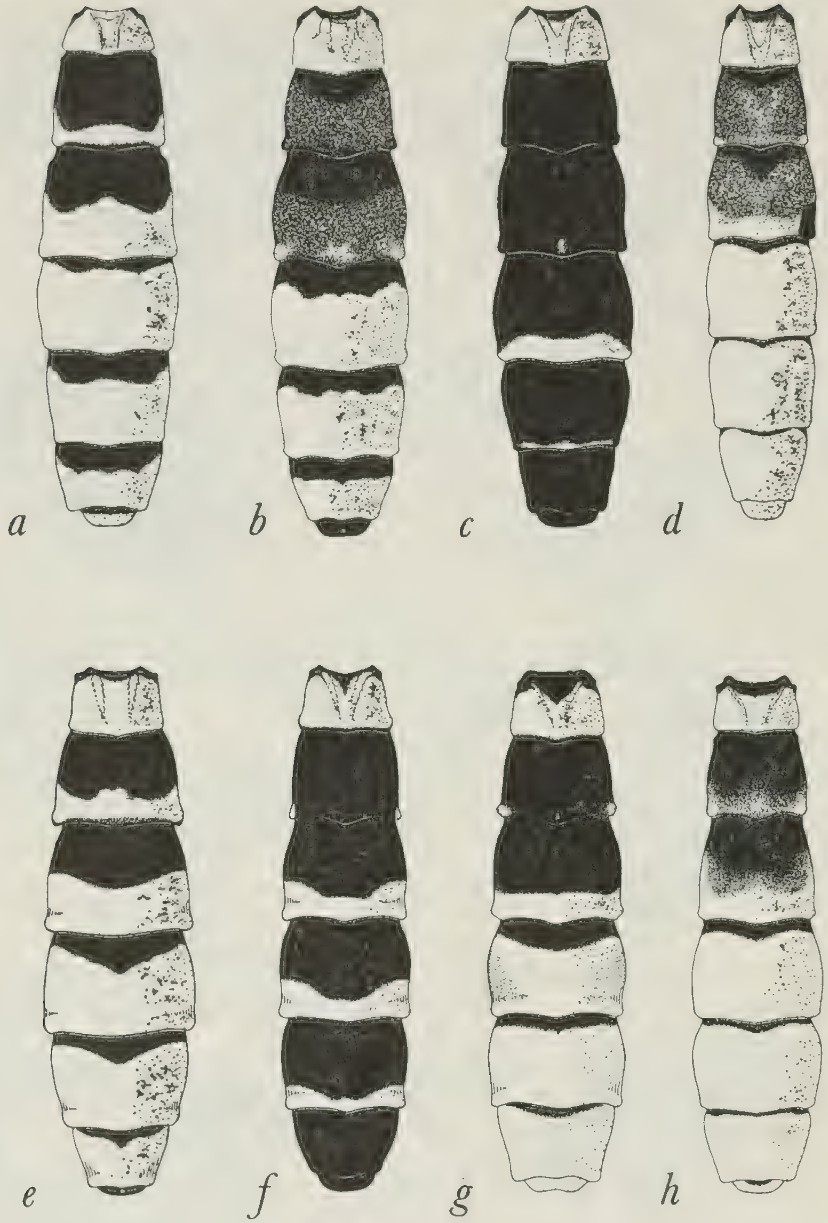


FIGURE 183.—Abdomens of species of *Metopius*, ♀:

a, *robustus concinnus*
b, *robustus mirandus*
c, *robustus robustus*
d, *mimicus*
e, *krombeini epixanthus*
f, *krombeini krombeini*
g, *pulchellus montanus*
h, *pulchellus sonora*

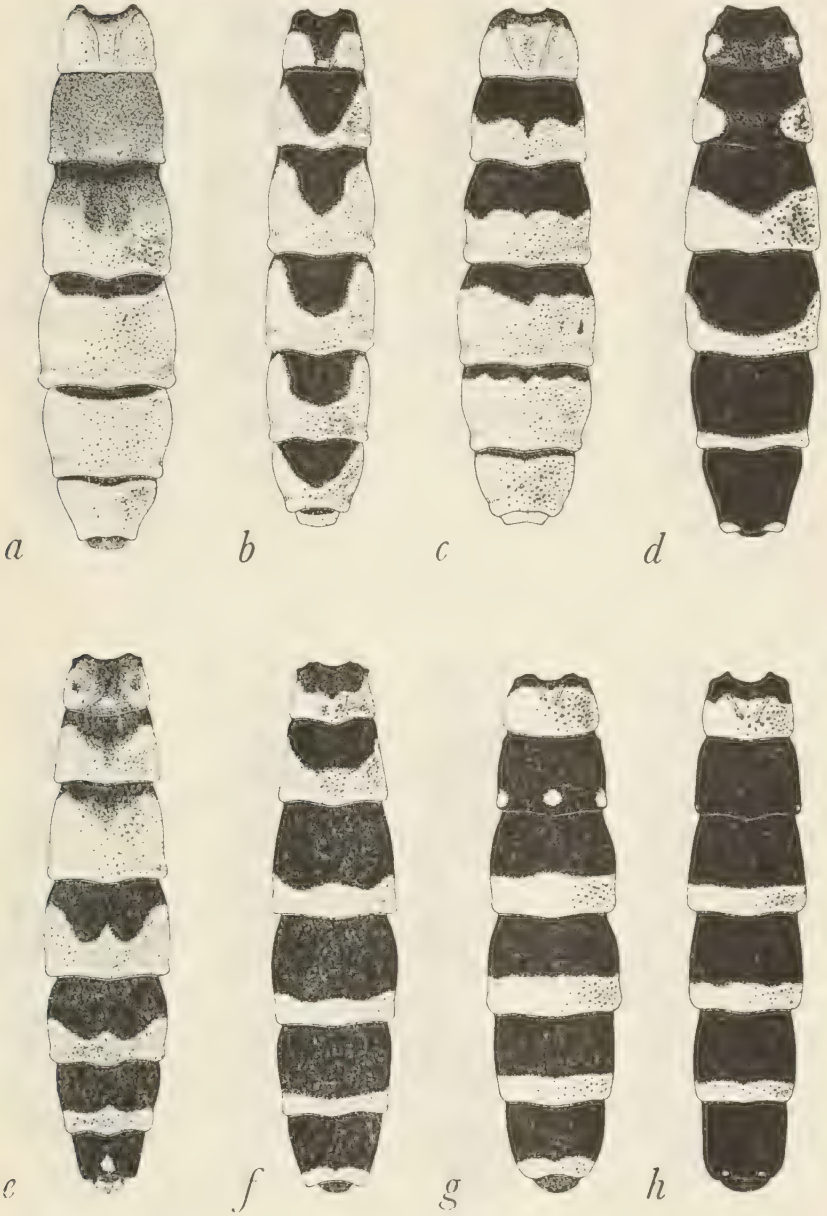


FIGURE 184.—Abdomens of species of *Metopius*, ♀:

a, *pulchellus pulchellus*
b, *galbaneus*
c, *vittatus*
d, *comptus*
e, *scapulatus*
f, *xanthostigma*
g, *consector*
h, *ultimatus*

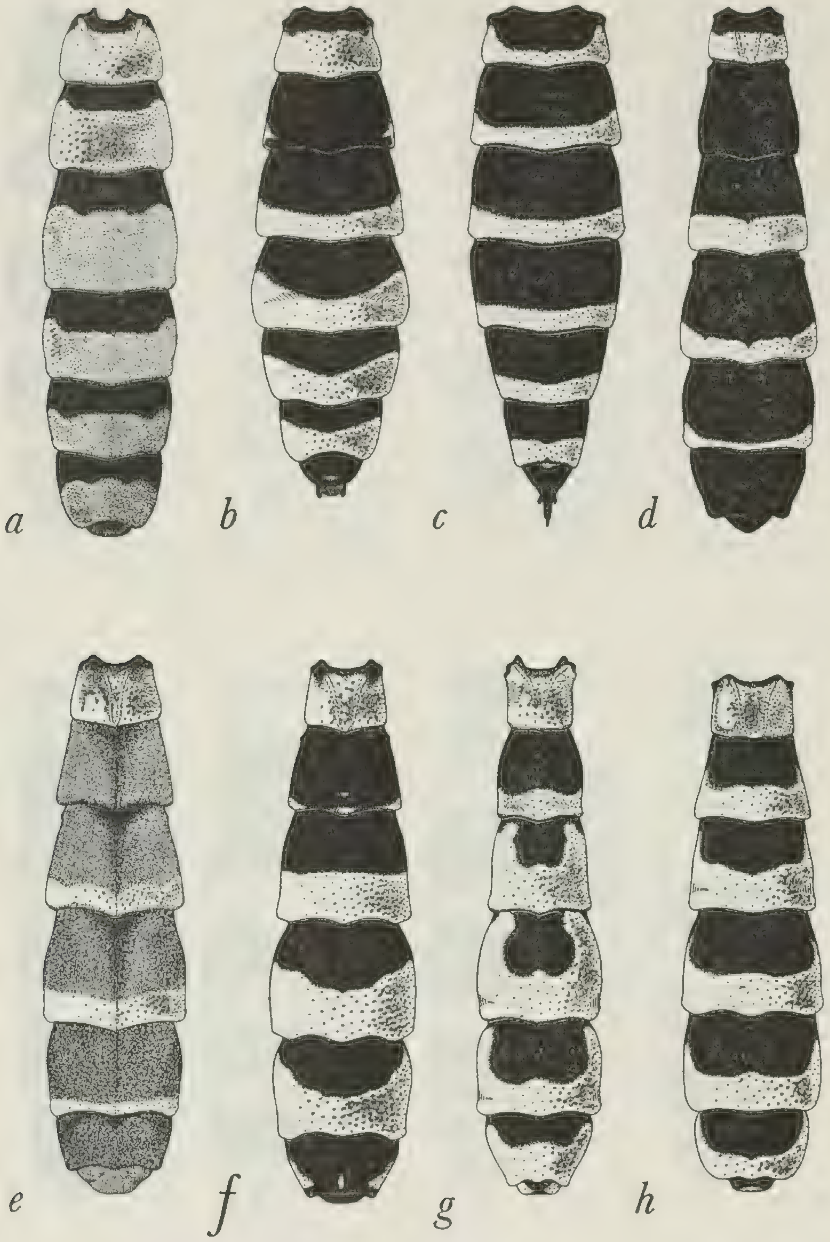


FIGURE 185.—Abdomens of species of *Metopius*, ♀:

a, *birkmani*
b, *secundus*
c, *rileyi*
d, *errantius errantius*
e, *errantius floridanus*
f, *errantius arizonicus*
g, *errantius californicus*
h, *notatus*

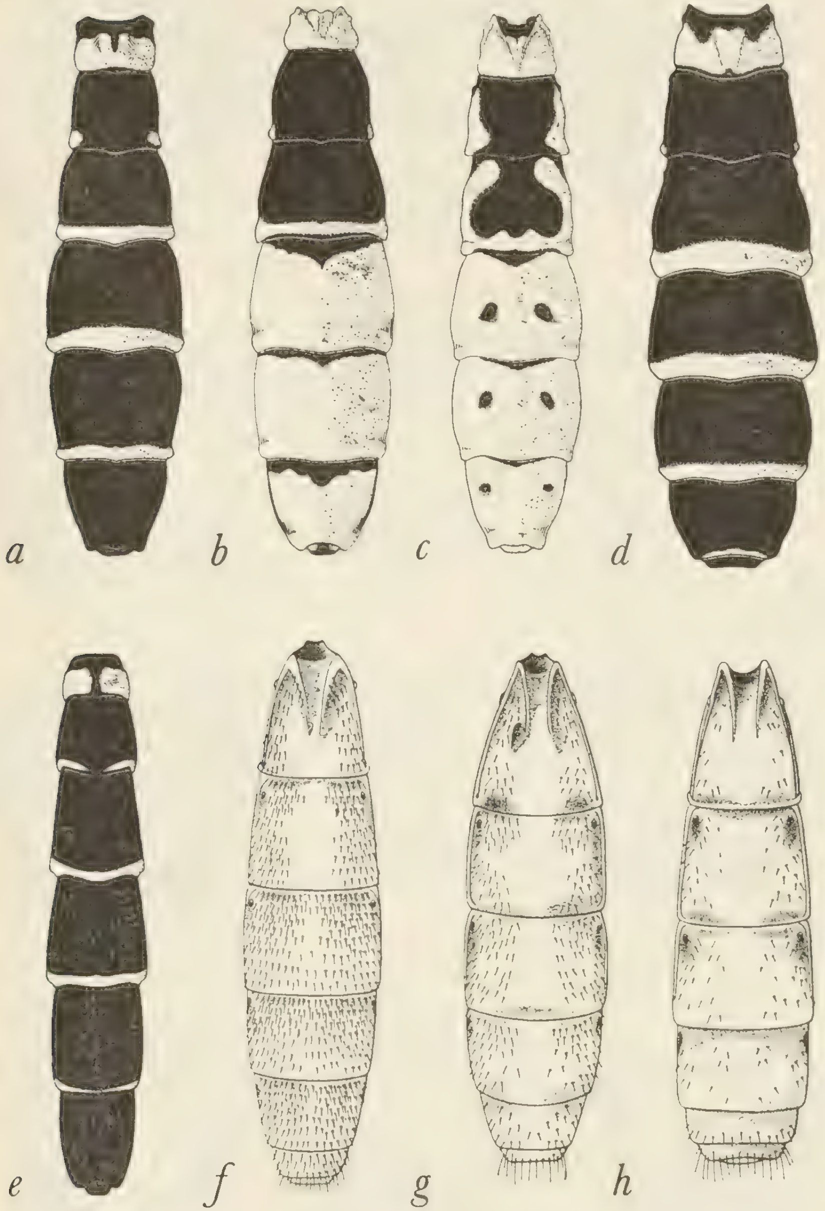


FIGURE 186.—Abdomens: a–e, species of *Metopius*, ♀, showing color pattern; f–h, species of *Triclistus*, ♀, showing hair arrangement:

a, *M. pollinctorius pollinctorius*
b, *M. pollinctorius nevadensis*, var.
c, *M. bellus*
d, *M. edwardsii*
e, *M. basalis heinrichi*
f, *T. emarginalus*
g, *T. chosis*
h, *T. pallipes*

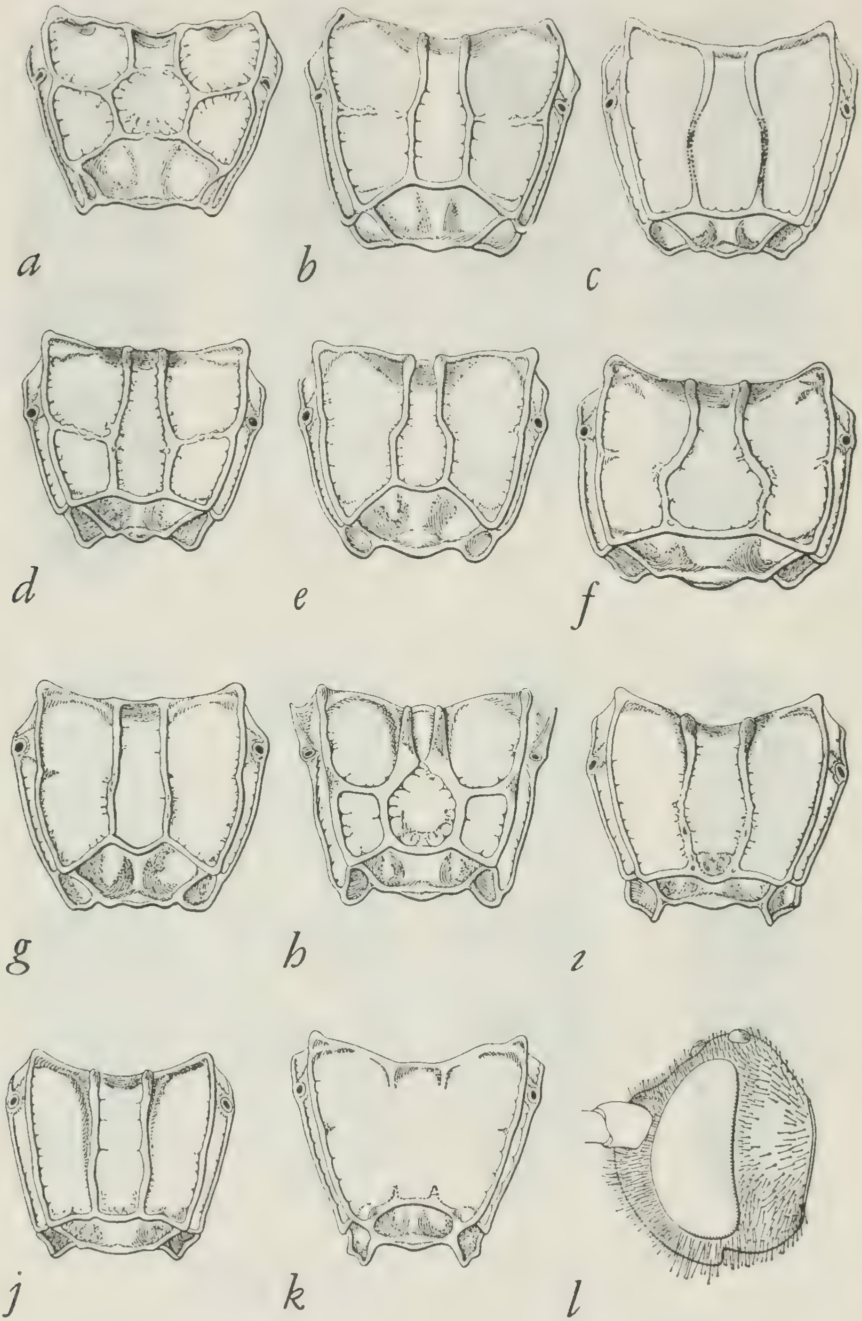


FIGURE 187.—Species of *Triclistus*, ♀ : a–k, propodea; l, head, showing hair arrangement on temple.

a, *crassus*
b, *brunnipes*
c, *emarginalus*
d, *occidentis*
e, *rectus*
f, *evexus*
g, *adustus*
h, *propinquus*
i, *chosis*
j, *pallipes*
k, *melanocephalus*
l, *chosis*

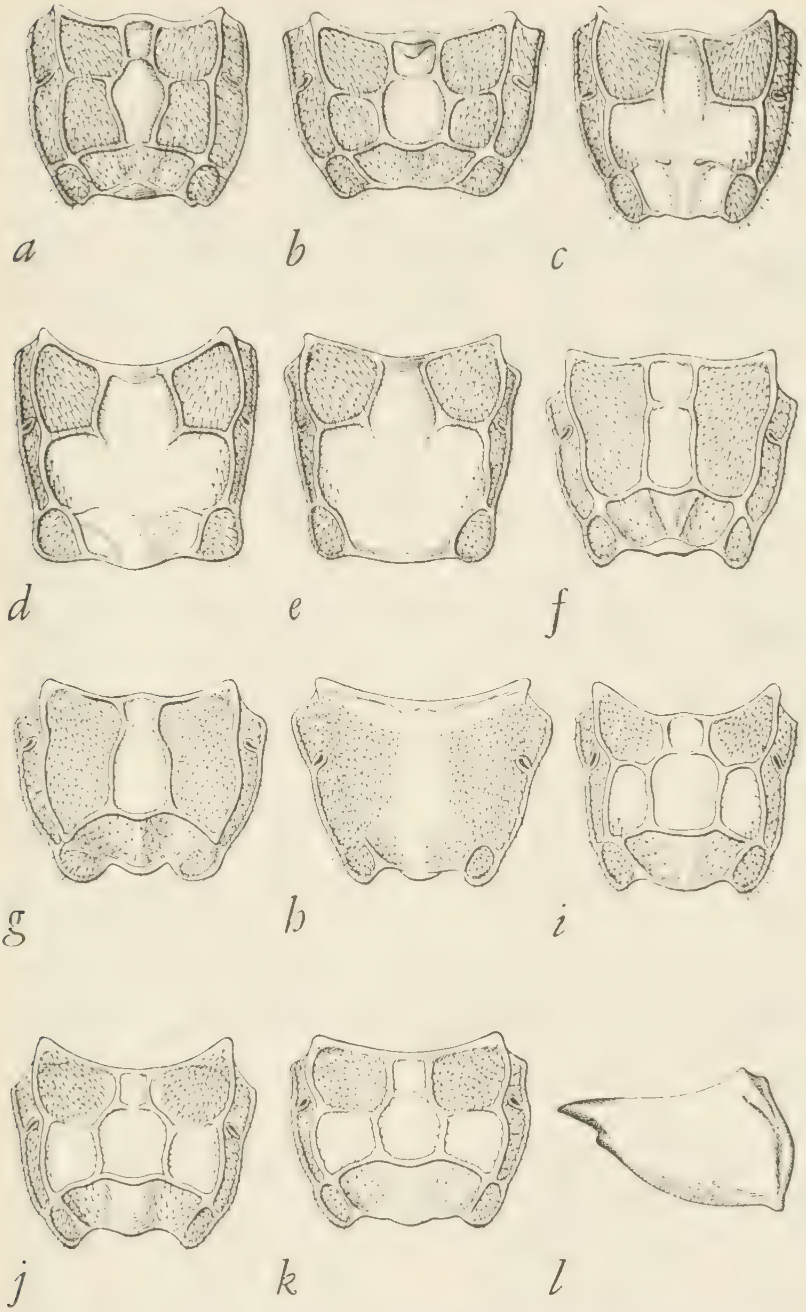


FIGURE 188.—Species of *Exochus*, ♀ : a–k, propodea, showing carinae and hair arrangement; l, mandible.

a, *stenostoma*
b, *mitratus orias*
c, *pictus xanthopsis*
d, *russeus*
e, *enodis*
f, *montivagus*
g, *flavifrontalis*
h, *atriceps atriceps*
i, *?sulcatus*
j, *albifrons*
k, *decoratus scitulus*
l, *stenostoma*

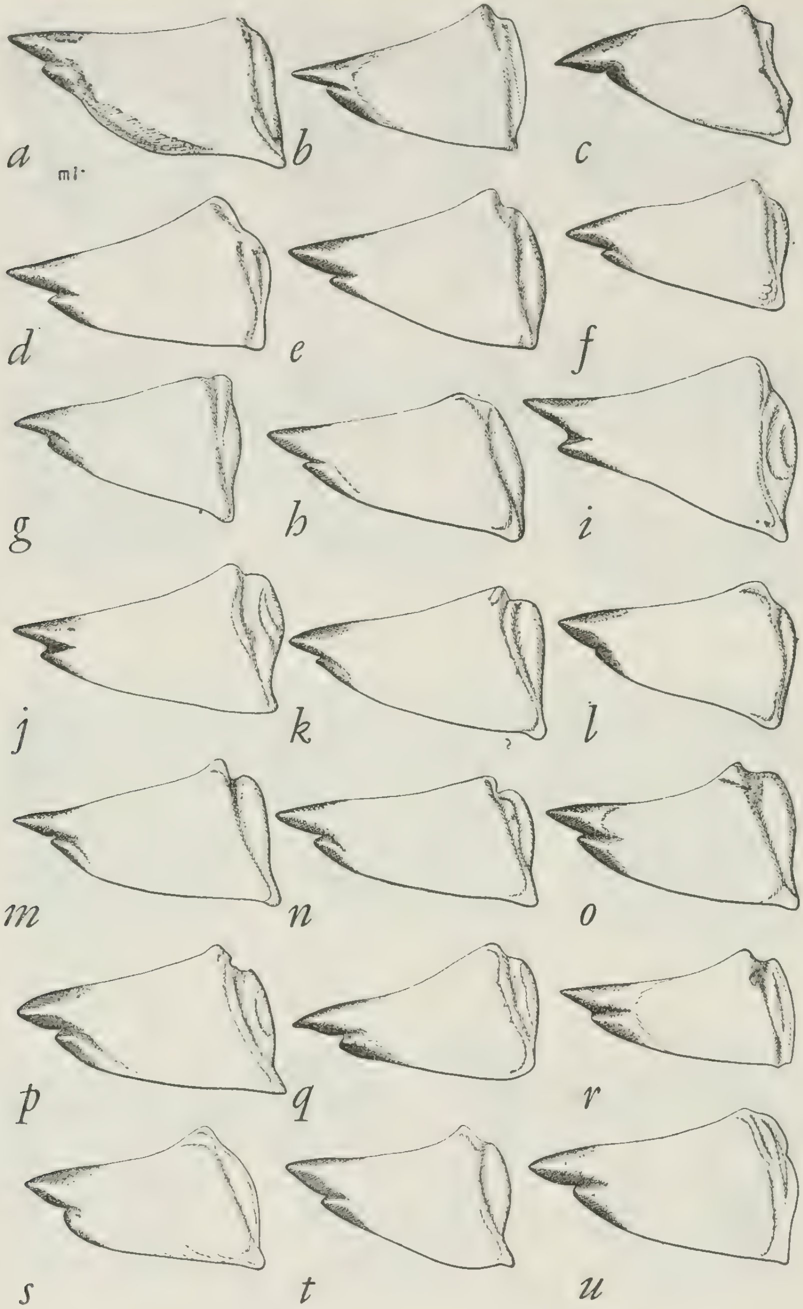


FIGURE 189.—Mandibles of species of *Exochus*, ♀ (except as noted):

a, *mitratus orias*
b, *pictus xanthopsis*
c, *gravipes*
d, *montivagus*
e, *flavifrontalis*
f, *atriceps atriceps*
g, *?sulcatus*
h, *annulicrus*
i, *evetriae*
j, *hiulcus*
k, *nigripalpis tectulum*
l, *tenebrosus*
m, *albifrons*
n, *rutilatus*
o, *armillosus*
p, *brutus*
q, *virgatifrons*
r, *ferrugineus*
s, *mesorufus*
t, *genualis*, ♂
u, *peroniae*

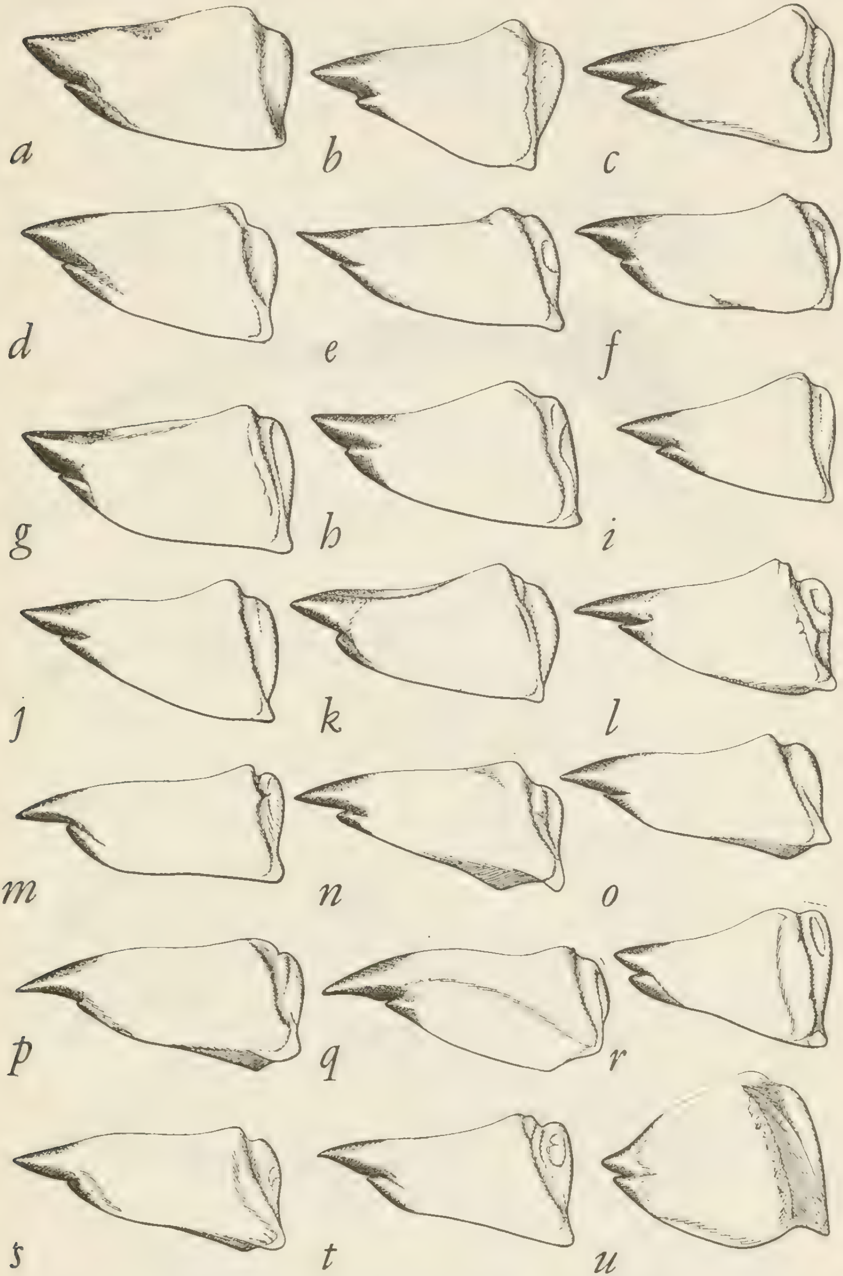


FIGURE 190.—Mandibles of species of *Exochus*, ♀ (except as noted):

a, *cnemidotus*
b, *externus*
c, *capnodes*, ♂
d, *signifer*
e, *transversus*
f, *postfurcalis*
g, *spilotus*
h, *dorsalis dorsalis*
i, *fastigatus*
j, *canidens*
k, *denotatus*
l, *ostentatus*
m, *quadradens*
n, *cuneatus*,
o, *pleuralis*
p, *mesodon*
q, *megadon*
r, *decoratus scitulus*, ♂
s, *ventricosus*
t, *silus*
u, *decoratus scitulus*

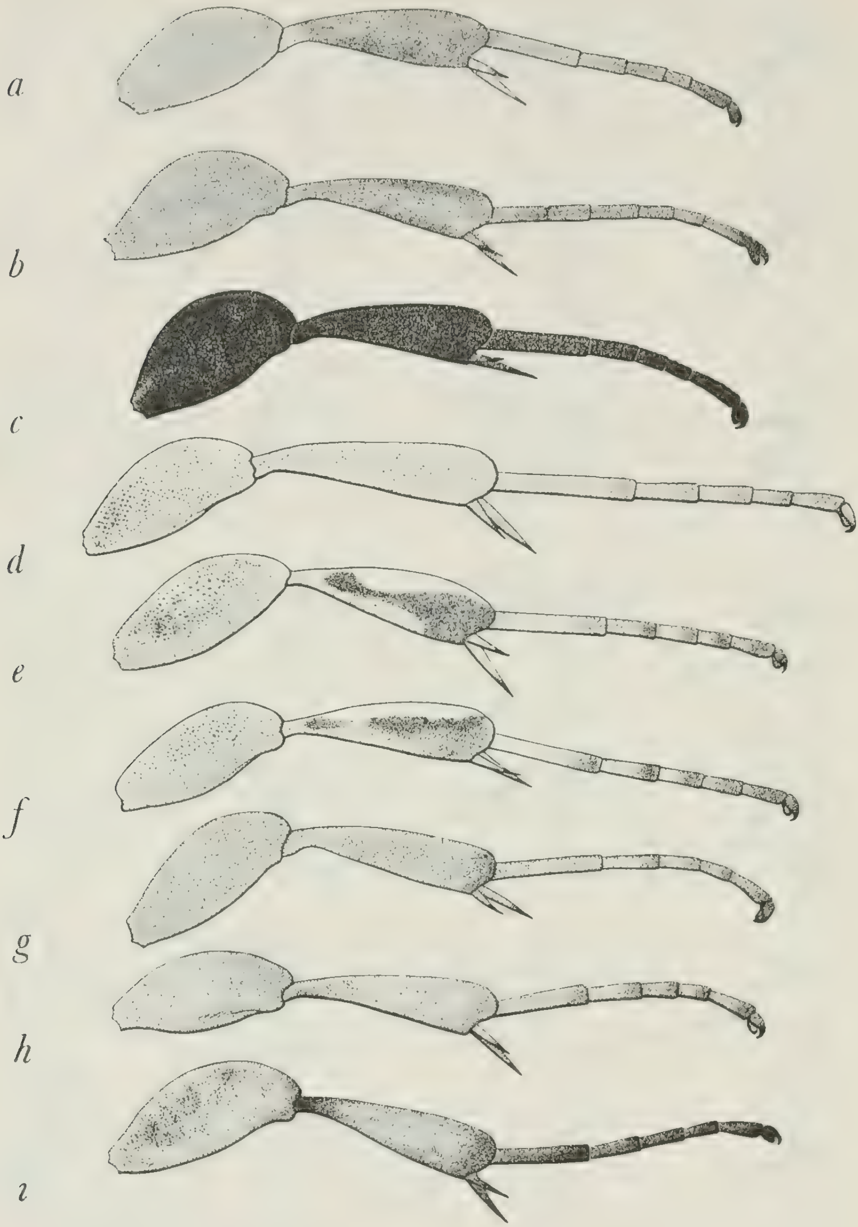


FIGURE 191.—Left hind legs of species of *Exochus*, ♀:

a, *stenostoma*
b, *mitratus orias*
c, *turgidus*
d, *pictus xanthopsis*
e, *russeus*
f, *enodis*
g, *bryanti*
h, *semirufus*
i, *elimatus*

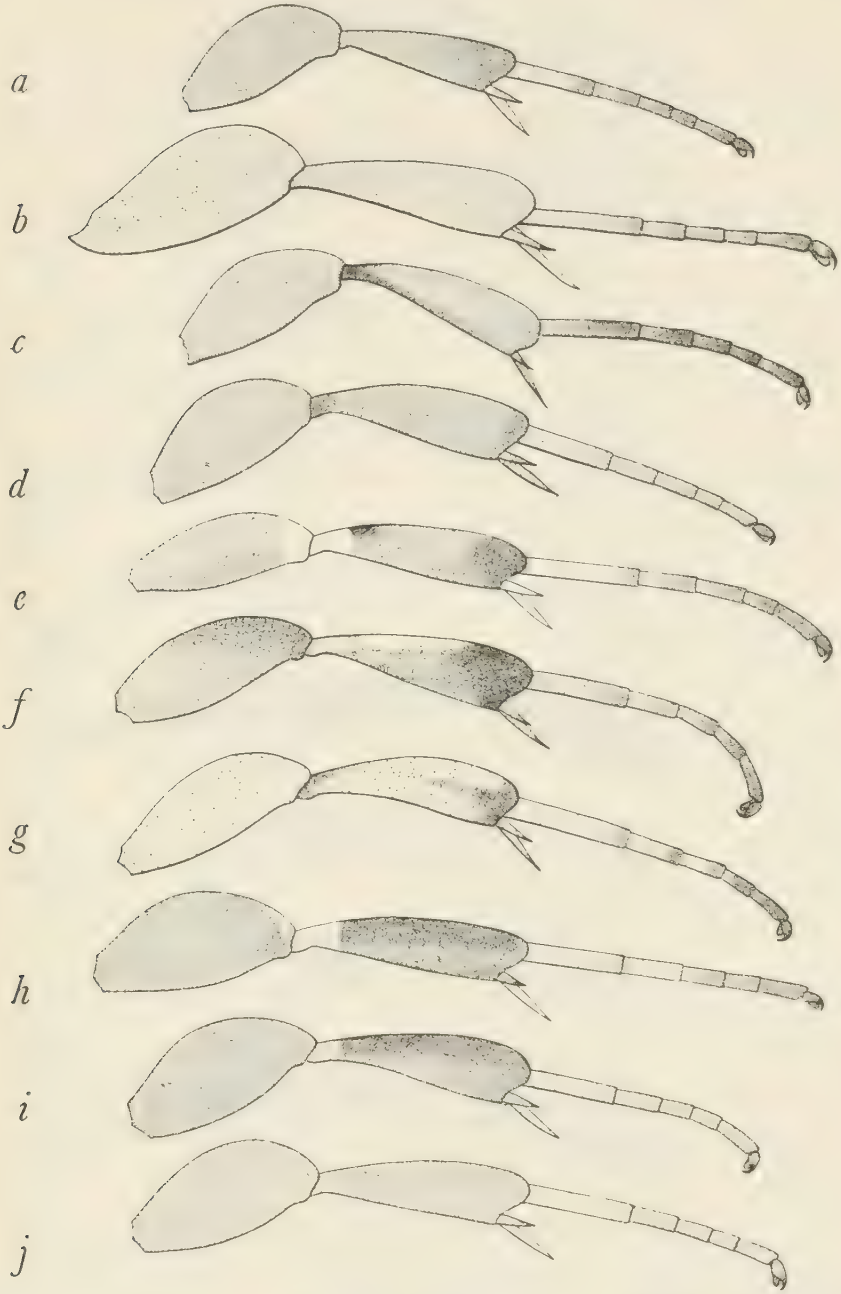


FIGURE 192.—Left hind legs of species of *Exochus*, ♀ (except where noted):

a, *gravipes*
b, *litus*
c, *pullatus*
d, *washingtonensis*
e, *montivagus*
f, *ochreatus*, ♂
g, *spinalis*
h, *flavifrontalis*
i, *dentifrons*
j, *atriceps atriceps*

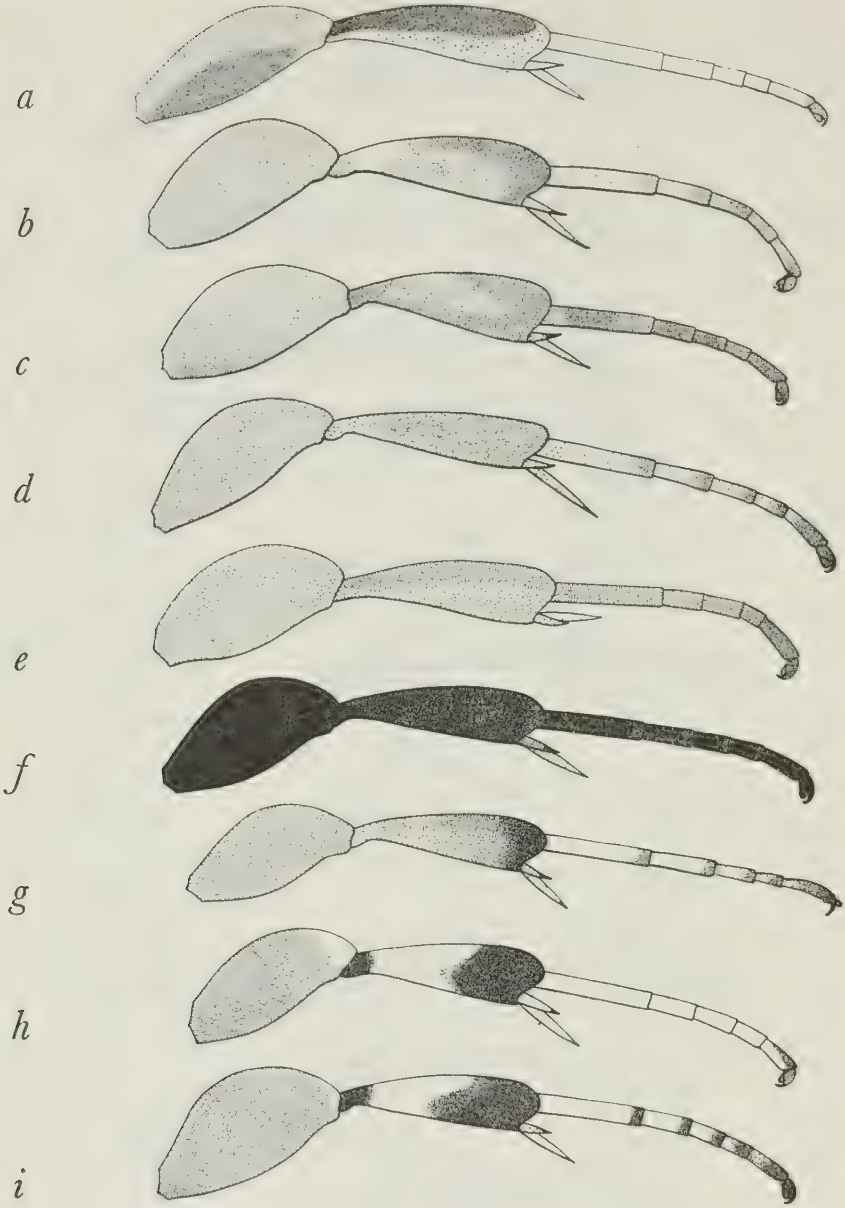


FIGURE 193.—Left hind legs of species of *Exochus*, ♀ :

a, *? sulcatus*
b, *annulicrus*
c, *evetriae*
d, *hiulcus*
e, *nigripalpis tectulum*
f, *tenebrosus*
g, *albifrons*
h, *rutilatus*
i, *armillosus*

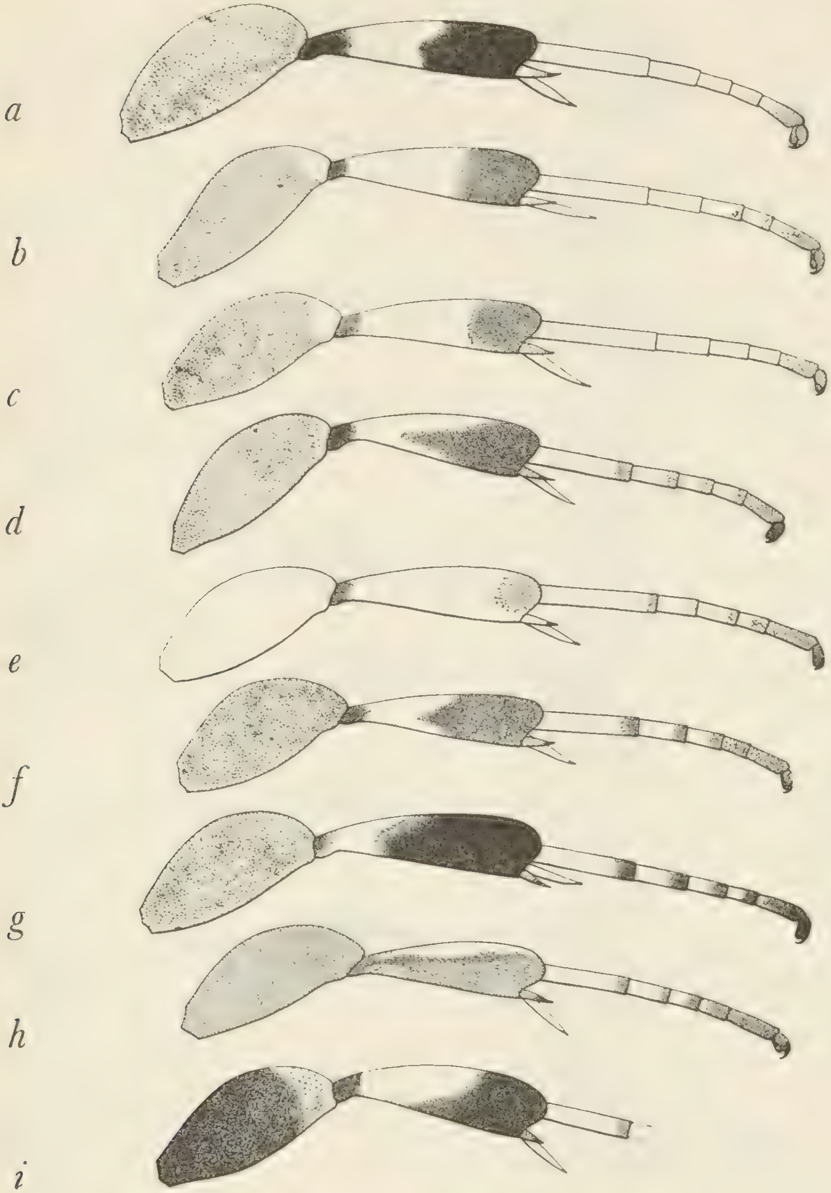


FIGURE 194.—Left hind legs of species of *Exochus*, ♀ (except where noted):

a, *brutus*
b, *virgatifrons*
c, *ferrugineus*
d, *mesorufus*
e, *genualis*
f, *peroniae*
g, *cnemidotus*
h, *externus*
i, *capnodes*, ♂

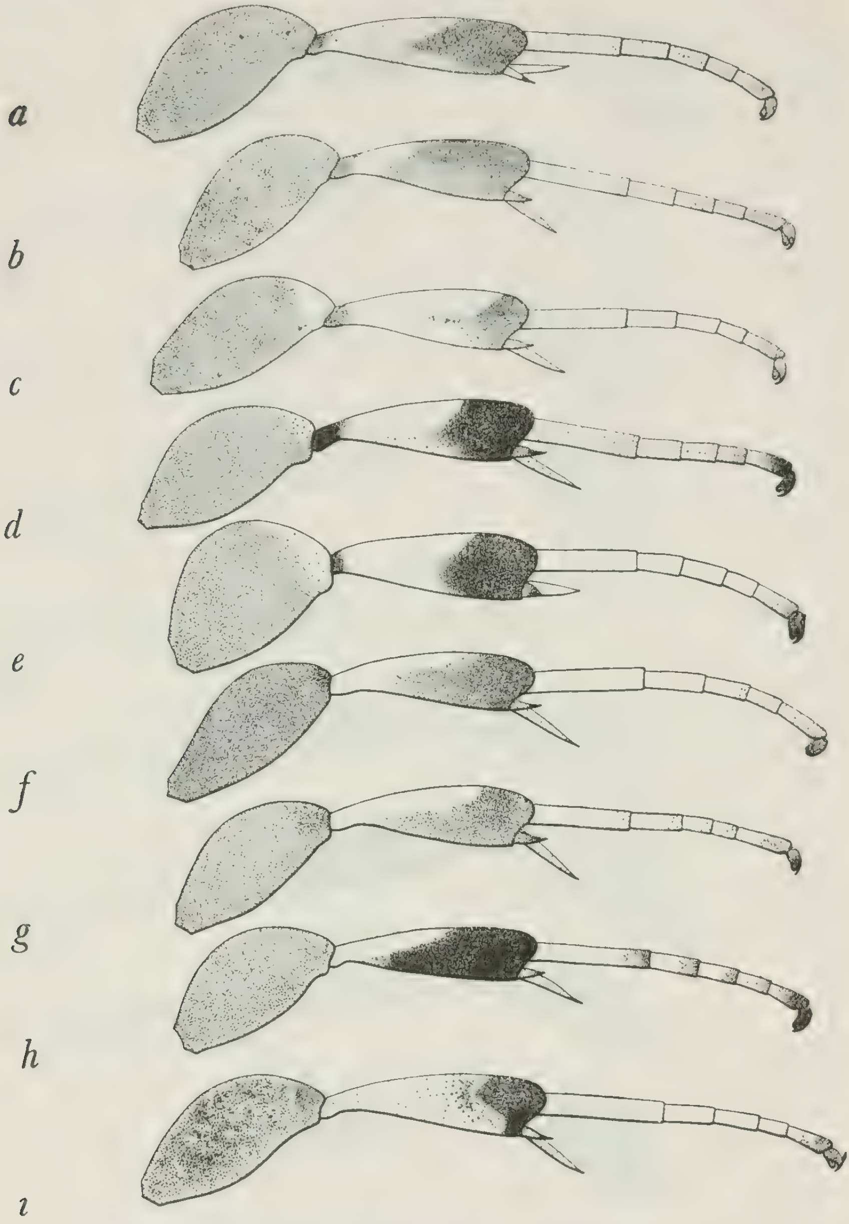


Figure 195.—Left hind legs of species of *Exochus*, ♀ :

a, *signifer*
b, *transversus*
c. *postfurcalis*
d, *spilotus*
e, *dorsalis dorsalis*
f, *fastigatus*
g, *canidens*
h, *denotatus*
i, *ostentatus*

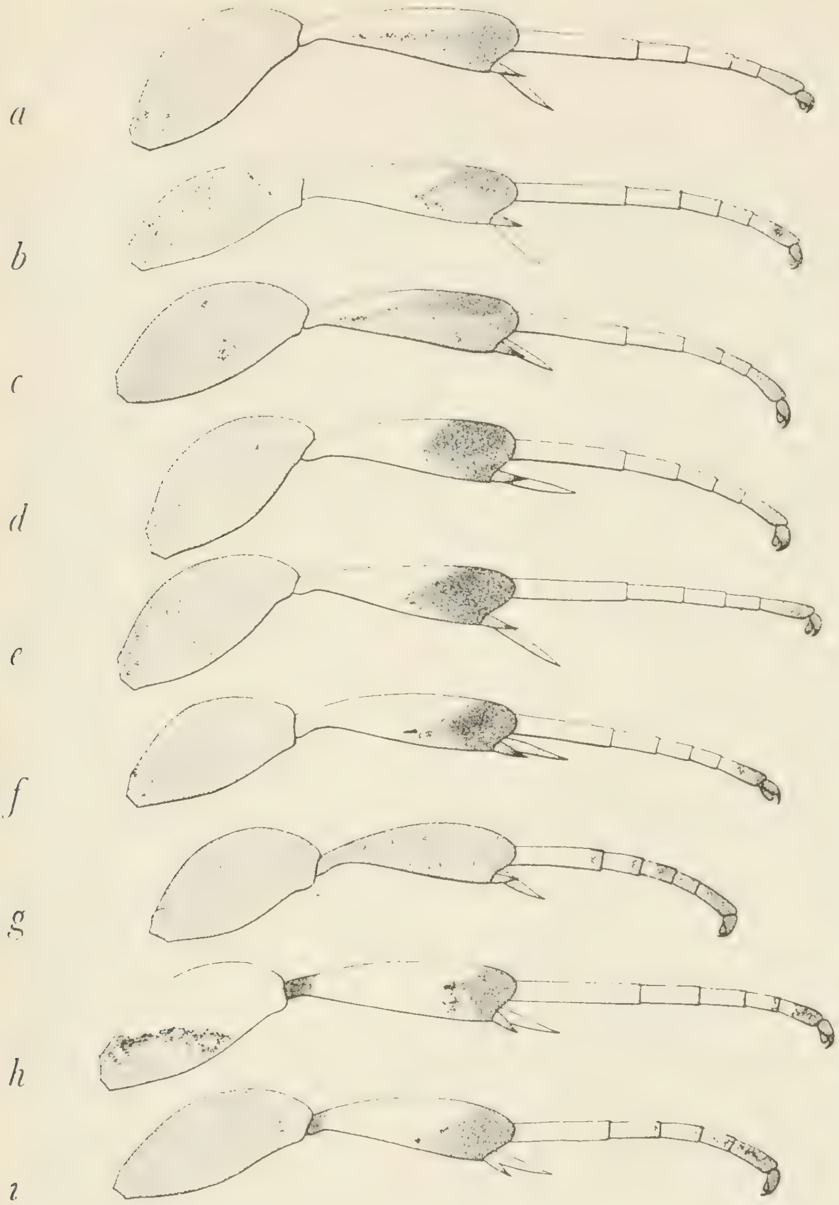


FIGURE 196.—Left hind legs of species of *Exochus*, ♀ (except where noted):

a, *quadradens*
b, *cuneatus*, ♂
c, *pleuralis*
d, *mesodon*
e, *megadon*
f, *ventricosus*
g, *silus*
h, *decoratus scitulus*
i, *mandibularis*

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